ELECTRICAL REVIEW

May 9, 1947

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Contents :—

	Page
EDITORIAL—Coalfield Generation	741
ARTICLES—	
All-Electric Flour Mill	743
Continuous Maximum Rating. By A. N. D. Kerr, A.M.I.E.E.	749
Indian H.V. Laboratory. By V. S. Swaminathan, M.A., M.Sc. (Lond.)	758
Industry and the House. By F. J. Erroll, M.A., A.M.I.E.E., M.P.	759
Overcoming Labour Shortage	765
Electricity Supply in Poland	766
Water Heater Production	771
REPORTS—	
Supervisors' Dinner	747
Australian Electrical Manufacture	750
Bankside Power Station	753
British Industries Fair	754
REPORTS—*continued*—	
Electricity Bill	763
Electricity in the Highlands	764
Bury Undertaking's Jubilee	764
NEWS SECTIONS—	
Personal and Social, 755 ; Parliamentary, 761 ; Commerce and Industry, 767 ; Electricity Supply, 775 ; Financial, 778 ; Contracts, 783.	
VIEWS ON THE NEWS	748
CORRESPONDENCE	751
NEW BOOKS	774
RECENT INTRODUCTIONS	777
NEW PATENTS	781
NEXT WEEK'S EVENTS	782
Classified Advertisements	59
Index to Advertisers	88

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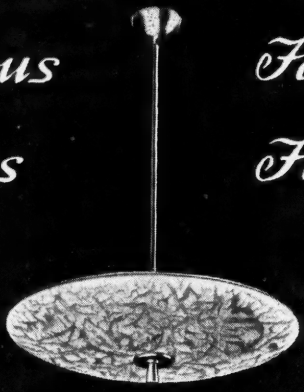

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXL. No. 3624 MAY 9, 1947 9d. WEEKLY

Coalfield Generation

Desirable But Not Always Feasible

FROM time to time the question is raised, perhaps naturally, as to whether electricity for public supplies could not be more suitably generated at the source of its raw material, coal, as would be desirable for many reasons, rather than near the centres of industrial demand. The answer depends primarily on comparative costs. At the present stage of technical development it is found less expensive to transport coal (including ash and moisture), particularly by sea, than to transmit electricity, as stated by Mr. J. Hacking in this year's Faraday Lecture.

Cooling Water Requirements

Even were this not so, other factors have to be taken into account that upset the straightforward comparison. Assuming that sites were acquired for capital stations which would not be affected by colliery workings below ground, there remains, first, the need to secure at all seasons plentiful quantities of acid-free water. This is seldom possible in mining areas to the extent required, viz., 50 gal. of water for condensing the exhaust of a steam turbine, in order to secure the high vacuum essential to operation with the least fuel consumption for each lb of coal burned under the boilers. Even with concrete cooling towers, the amount of make-up water is usually far beyond the capacity of water supplies available locally. As industries tend to be attracted to riparian sites, this provides a double reason for erecting power stations there.

Overhead lines have proved their reliability, and importance need not be attached to arguments against transmission of electricity on their account. Actually pit-head power stations have been in use for the past forty years or more, as on the North-East coast, where they feed into the company's extensive high-voltage network, but their individual kW ratings are too small to give the highest efficiency or to enable them to make a material contribution to the national output.

A power station dependent upon one colliery or group of adjacent collieries would probably have the advantage of securing coal with more consistent burning characteristics, but provision would have to be made for augmenting considerably the rail, river, canal or road access to its site, in any case necessary for the delivery of plant and materials, in order to allow coal to be brought in from outside in the event of any serious falling off in the tonnage raised throughout the twenty years' life of the station.

Supplies May Be Inadequate

Coal from pits conveniently close to the site and of the low grades usable in power stations (since the better types should be reserved for other industries) may not always be enough to ensure the full output of a modern power station of the most suitable or economical size. Thus at the recent official inquiry regarding the reconstruction of Bankside station, a suggestion that the electricity used in London should be generated at the Kent coalfield was countered by the evidence that the latter could contribute no more than 7 per cent of requirements.

While, then, there are no evident grounds in present-day experience on which to base a general case for generating electricity in bulk at the coalfields, individual instances that show promise will no doubt be investigated. The development of the gas turbine, for example, giving relative freedom from "the tyranny of water," coupled with advances in high-voltage technique, might make such instances less rare.

Parliamentary Pressure

BY the ruthless use of the "guillotine" procedure the Transport Bill has been forced through the House of Commons with many of its provisions undiscussed. At present the Electricity Bill is slowly going through its committee stage. So far at least each clause has been thoroughly gone into, but it is said that the Government intends to conclude this before Whitsun. A Bill for the nationalization of the iron and steel industry (or part of it) is expected next session but it appears that the nationalization of the gas industry is to be held over until the 1948-49 session. Logically this measure should have followed (or perhaps preceded) the Electricity Bill but it is doubtful whether logic plays much part in these matters.

Bankside Station

AT a public inquiry in January into the proposal to erect a new power station on the Bankside site most of the opposition was based on its effect upon the Abercrombie Plan which provided for a cultural and residential area on that side of the Thames. Little was said of the probable effect of the station upon St. Paul's Cathedral, a matter which has been the subject of many recent letters to *The Times* and of questions in Parliament. The points raised have been replied to by Mr. H. J. Randall, managing director of the City of London Electric Lighting Co., who shows that much of the apprehension has been due to incomplete knowledge of the probable nature and dimensions of the station. He believes that the scale model of the area which is being prepared will allay some of the fears that the station will "dwarf" the Cathedral. The opponents of the scheme are not letting the matter rest and a motion calling for reconsideration of the approval of the scheme is to come before the House of Commons.

The Fair Revived

So far as the exhibits are concerned the first post-war British Industries Fair is well up to pre-war standard. Austerity is found only in the ancillary services but, even here, arrangements are pretty well as good as they were in 1939. Exhibitors have plainly put their generally limited space to the best possible use, with the result that overseas visitors have been greatly impressed by the range and quality of the products shown. We are confirmed in our opinion that the revival of the Fair this year will prove worth while.

Small Highland Supplies

IT is not obvious from the official particulars reported in this issue that existing consumers "will benefit by a reduction in tariff rates" as a result of the Glen Lussa hydro-electric scheme. Rather does the project seem to support the view expressed in the Cooper Report that, from the economic angle, electricity could be made available from small falls in the Highlands only if these were lumped together financially with larger hydro stations feeding the grid. The 8·5 million kWh mentioned as the average annual output presumably means the potential resources; otherwise this would imply a load factor of nearly 100 per cent, allowing one of the two 1,000-kW turbo-alternators as stand-by, or half that value if the two sets were run in parallel.

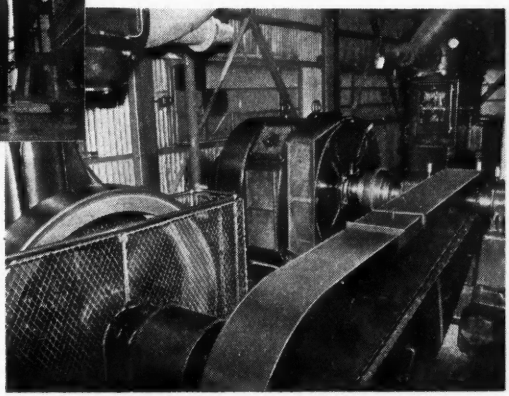
The Kintyre Scheme

PRESUMABLY the 1,260 kW of oil engines in the stations at Campbeltown and Ardrishaig would, in that case, provide stand-by, but the load-factor in 1945 for these local centres of population was only 37·5 per cent for less than 3 million kWh generated. In the Commissioners' most recent returns (1942) the combined generating cost was given as 1·2d. per kWh, whereas overall costs of Glen Lussa, including transmission, taken at only 6 per cent of capital expenditure, would have amounted to 2·3d. per kWh. Maintenance of the oil engines as stand-by has also to be added. Such schemes possess the extraneous merit of saving fuel as well as serving isolated areas at little further cost, once the work is complete, but they call for every effort to raise load factors in order to approach ultimate economic justification.

All-electric Flour Mill

Sequence Control Ensures Foolproof Operation

THREE main advantages have resulted from the complete electrification of the Co-operative Wholesale Society's new flour mill at the Royal Victoria Dock, London. One is the way in which a system of sequence control has made possible exceptionally quick starting up of the plant and has minimized both the possibility and effects of stoppage. The second is the remarkably small number of operatives needed to work the mill. For the first section of the plant, which has a nominal output of 240 bags (140 lb each) an hour, only about sixty men per shift are engaged on actual production work and this number will have to be increased to not many more than a hundred to cope with treble the output when the remaining two sections of the installation are completed.



Grain ships are emptied at a rate of 400 tons an hour by means of two pneumatic suction intake towers. Right: One of the suction plants

Thirdly, the plant can be run for long periods day and night without stopping and has in fact on several occasions operated continuously for six weeks or more.

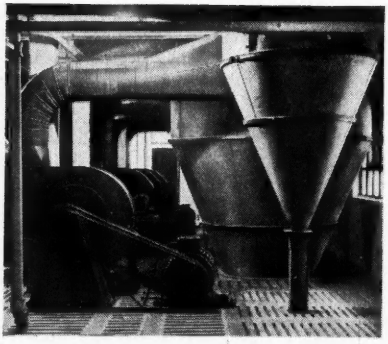
The premises stand on a five-acre site and, although the preliminary work was begun in 1936, because of subsequent wartime difficulties, the mill did not start production until May, 1945.

A two-phase, 6,300-V, 50-cycle supply from the West Ham Corporation is received at two substations each containing two 1,500-kVA Metrovick Scott-connected groups to give a three-phase, 400-V supply. On the first floor of each substation is a l.v. switchroom equipped with cubicle-type switchboards (Ferguson, Pailin) incorporating spring-operated 2,000-A and 2,500-A circuit breakers of 25-MVA rupturing capacity. Each panel is provided with overload and earth leakage protection. In normal circumstances each transformer group will feed a separate equipment of the mill and bus-section circuit-breakers have been installed

to sectionalize the load and thereby limit the fault current. Cantie power fuseboards are installed. Four Johnson & Phillips 1:1 transformers supply the lighting circuits.

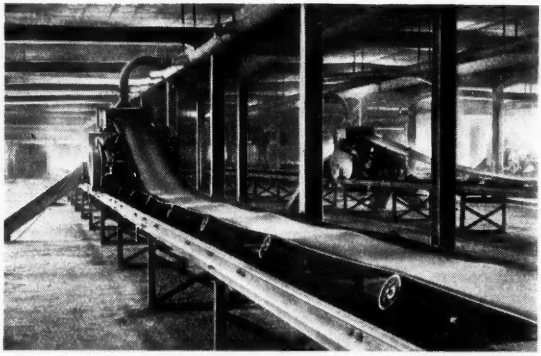
Broadly, the buildings comprise a silo, a wheat-cleaning department, the mill proper and a warehouse. The silo consists of 118 bins of 100-ft depth with a total holding capacity of 44,000 tons. At either end of the silo bins is a wheat receiving house, one for the acceptance of foreign wheat from ships and the other for English wheat delivered by road vehicles and rail.

The grain ships, the largest types of which can be accommodated at the 300-ft hatch, are emptied at a rate of 400 tons an hour by means of two pneumatic suction intake towers which are moved on rails to any position on the quayside. Each intake tower consists of two units, each separately operated by a 140-H.P. motor to handle 100 tons an hour. The four individual units can be employed separately if desired. For the traversing motion there is a 25-H.P. motor on each tower with a 5-H.P. unit for the tipper and two 7½-H.P. motors for winches. As a safety precaution the lighting supplies on the towers are taken from transformers at 110 V.



Cyclone type wheat-cleaning plant

After weighing, the wheat is discharged through rotary seals on to two conveyors (25-H.P. motors) running in an underground subway parallel to the dock. From the conveyor three bucket-type elevators (with 55-H.P. motors) carry it to the receiving house at the top of the 250-ft high silo building whence it is taken to preliminary cleaning machines which extract by means of sieves, electro-magnets, etc., large-sized foreign matter such as wood, iron, etc. After being elevated again to the top of the silo the grain is carried by a further system of conveyors, throw-off carriages and chutes to the silo bins.



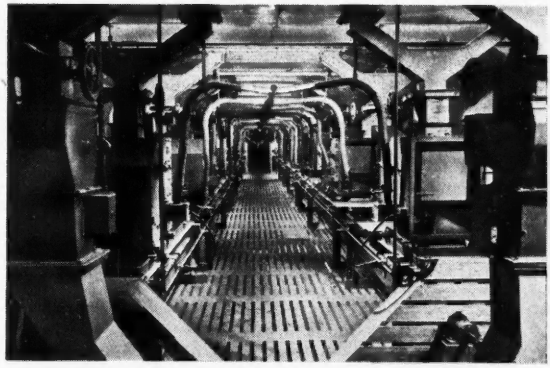
High-speed conveyors and throw-off carriages in the silo building

The English wheat delivered by road and rail is also discharged and stored in the same building. Generally it needs drying to enable it to be kept in store for a considerable time and special preliminary cleaning apparatus used includes all-metal rubble extracting machines consisting of large revolving squirrel cages. The grain is small enough to pass inside these cages but the large rubble is not: at the same time currents of air carry away light material.

From the silos, elevators and conveyors take the wheat to the cleaning house storage bins. If necessary a regulated amount of water is added by means of a water-wheel damper. A milling separator consisting of a number of vibrating sieves removes large and certain small seeds, sand, etc. Round seeds smaller than the grain are eliminated via indented discs of Carter-Mayhew separators. Washing, the removal of stones and various other impurities, and "whizzing" for removal of surplus moisture are carried

out by a combined washer and whizzing machine, and as a final stage in preparing it for milling the wheat passes through a conditioning plant which removes surplus moisture and reduces the temperature to normal.

After a short period in the conditioning bins the grain is automatically blended by means of synchro-weighers and then goes through further Carter-Mayhew disc separators to remove larger grains such as oats and barley. Stray pieces of metal are extracted by means of electro-magnets and then scourers incorporating rotating metal beaters take away such matter as mudballs, smut and bunt. Terminal brush machines polish the grain before it is delivered to the bins which feed the



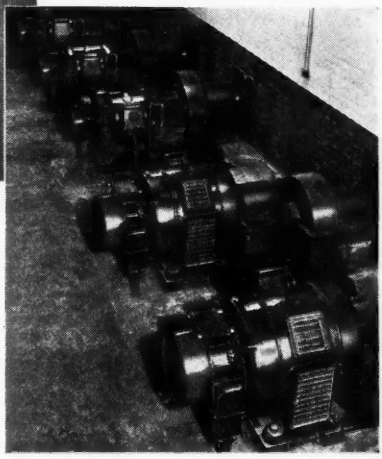
Blending is carried out automatically by means of electrically-operated synchro-weighers

100-H.P. and 70-H.P. motors group-drive the mills in which grain is broken

mill proper, extract fans removing the dust, etc.

A 900-lb automatic electrically controlled weigher feeds the mill. The first process here is the breaking down of the grain by means of a series of roller mills incorporating large grooved rollers running at different speeds. There are actually four "breaks" with progressively finer grooves before the required amount of endosperm is separated from the bran. To improve the quality of the flour and help the miller maintain the 80 per cent extraction without spoiling the colour a further process carried out by Forster machines recovers the high vitamin B content endosperm still adhering to the bran skin.

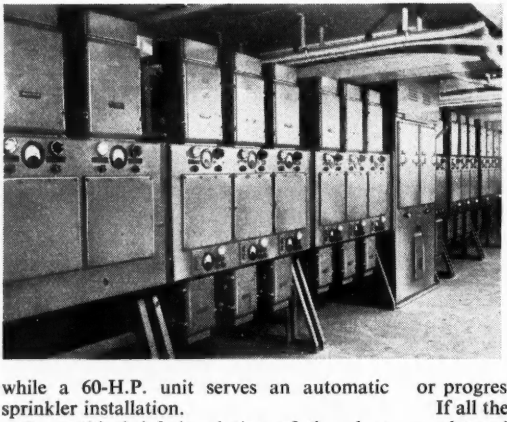
A series of "Plansifters" incorporating nests of flat sieves rotated on a plane surface first "scalps" or sifts away the bran released at the breaks and then grades the endosperm, this process being continued by purifiers consisting of reciprocating sieves through which currents of air pass. Machines similar to the break rolls



but with smooth rollers gradually reduce the bran-free stocks of various sizes to flour, plansifters or centrifugal dressers extracting the flour released at each stage. Actually over twenty stages of reduction and sieving are necessary before this final process is complete.

To ensure maximum efficiency of the machines and also to prevent clogging of the sieves and spouts a high-speed exhaust system incorporating fabric filters and multi-cone dust collectors is provided. Arriving at the eight-storey warehouse, the flour is mechanically weighed, packed and stored, each floor having a capacity of 2,000 tons. Chutes connect to road and rail loading bays.

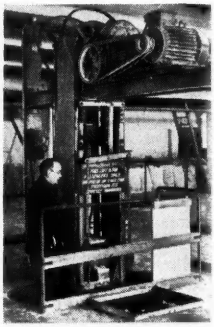
The size of the mill can be judged from the fact that in the section already in use there are fifty-four pairs of break rollers, each 60 in. long and forty pairs 40 in. long; 160 pairs of reduction rollers each 40 in. long; twenty-eight plansifters each containing seventy-two; eighty centrifugal dressers; forty-four purifiers; and several dust-collecting units with exhaust fans. In addition there are numerous elevators and horizontal conveyors, as well as pump house equipment comprising a 18-H.P. deep well pump delivering water to the wheat washing plant at the rate of 4,000 gallons per hour. A hydrant pump has a 100-H.P. motor, while a 60-H.P. unit serves an automatic sprinkler installation.



The switchboard from which the sequence of operations is controlled

From this brief description of the plant it will be appreciated what an elaborate and complicated process the preparation of flour is and how a stoppage at any particular stage might, unless precautions were taken, upset the whole rhythm of operations. With large-scale production such as this the stoppage of a machine could result in a very large quantity of flour piling up on the floor in a very few moments.

The mill is arranged to run as a single unit with group drives, there being three 100-H.P., twelve 70-H.P., four 25-H.P., and seven 20-H.P. motors situated in motor rooms at the end of the mill. These motors are all started by means of one master push-button, but each motor may be started or stopped for testing purposes by means of push-buttons on the starters. As is the case throughout the factory all the motors are of the Lancashire Dynamo & Crypto protected type equipped with Allen West starters.



Main lifts are a feature of the mill

Although from the operational point of view the ideal arrangement would be for all motors to start up simultaneously, practical considerations make it necessary to limit the current peaks. Accordingly a particularly flexible scheme of automatic sequence starting designed by Brookhirst Switchgear, has been arranged to predetermine, by means of adjustable links in each starter, the time at which the following starter in the sequence is energized.

If necessary, by means of a time-switch relay, all motors can be made to start simultaneously or progressively taking, say, seven minutes.

If all the motors have not started up by the predetermined time, the relay will close down all the machines, necessitating a new start. The relay will also shut down all motors in the event of operation of an emergency stop push, blown fuses, prolonged starting period of any motor, overloading of

any motor, the control switch not being in the automatic position, the starter isolator being open, or failure of supply.

Each panel of the main distribution switchboard is equipped with green and red signal lamps. The green lamp indicates supply available, control circuit in order, motor off. Each green lamp goes out as its starter is energized and a red lamp lights when the motor is up to speed. The master start and stop pushes are arranged on the main switchboard in the ground floor of the motor rooms. On pressing the start button, the sequence is commenced and proceeds automatically at the speed predetermined by the setting of the links mentioned and the loading on the motors. A Gent bell signalling system indicates to the engineer in charge when each floor is ready for starting up, while light indicators show the various bins in use for feeding the mill and indicate when bins are full or empty.

The whole of the plant in the intake and silo departments and the milling plant in the mill were installed by H. Simon & Co., Ltd. The boiler plant, millwrighting and electrical installation in all other departments were designed and executed by the C.W.S. Engineering Department, Manchester, under the supervision of the chief engineer, Mr. C. H. Burcham. We thank the C.W.S. for giving us permission to visit the mill, and also the various members of the staff for their assistance in preparing this article.

Supervisors' Dinner

Presentation to Mr. Brammer

THERE were about 400 present at the dinner given by the Association of Supervising Electrical Engineers on May 2nd, the first to be attended by ladies. Mr. H. Nimmo (president), proposing the toast of "Our Guests," mentioned that Mr. A. P. Trotter, a past-president, would be ninety years of age next month, and drew attention to the forethought shown by him, as electrical adviser to the Board of Trade, in drawing up the original Electricity Supply and Overhead Line Regulations, so that few modifications had been required since. During the past session the Association had opened ten new branches and had held 170 technical meetings at which papers of high quality had been presented. Whatever changes might come, there would be plenty of opportunities for supervisors in the re-equipment of industry and they would set worthy examples to their fellow-workers.

Raising Technical Standard

Responding, Mr. V. Z. de Ferranti (President, I.E.E.) referred to the close connection between the Association during its thirty-four years' life and the Institution which he represented, four of its presidents having filled the same office for the I.E.E. The Association had done much to assist electrical progress by raising the standard of technical training (in which the Swann Diploma was an important feature); the possession of this together with ability to organise and to control staffs ought to be adequately recognized. Miss Caroline Haslett (director E.A.W.), also responding, denounced the re-imposition of the purchase tax on such electrical apparatus as washing machines and vacuum cleaners, which took very little power but were real labour-savers. Such sacrifices on the part of housewives bore no real relation to the need for economy.

The presentation of a wireless set to the general secretary, Mr. A. Brammer, on completion of twenty-five years of service, and of a dressing-table set to Mrs. Brammer was the next item. Mr. R. W. Whittley, a founder member recalled the early enthusiasm of Mr. Brammer which was still unabated, and also the wisdom of his leadership. Mr. Brammer, in reply, referred to the Association as "a unique trade union," which owed much to the guidance of the late Mr. W. E. Highfield, as to lines of its development. In addition to encouraging technical training and securing recognition for its members, the Association had offered opportunities for them to meet as friends and not only as engineers.

The toast of "The Electrical Industry" was proposed by Sir William Halcrow (President, Inst.C.E.), who said that the public had realized through restrictions the importance of electricity in their lives. He illustrated the progress made in electrical engineering in connection with the several reports on the Severn Barrage. In 1916, 200 generating units were allowed for, in 1933 the number was reduced to 72 and in 1945 to 32 owing to the increasing unit capacities practicable. He welcomed the according of first preference to the construction of steam generating plant and thought that atomic energy would not become generally available for a long time.

Response was made by Mr. B. H. Leeson (Director, B.E.A.M.A.), who said that the electrical industry was the most highly organized and progressive of any and offered the best opportunities to women. It depended on good plant, well installed and well maintained by properly trained men, as represented by members of the A.S.E.E.

The evening concluded with a musical entertainment.

Views on the News

Reflections on Current Topics

THERE is a saying in stage circles, where a new production always looks as though it will never be ready in time for the opening, that "it will be all right on the night." I thought of this last Friday when I went to the press view of the British Industries Fair at Castle Bromwich, Birmingham. All over the place were packing cases, rolls of linoleum, trailing wires, wet paint and a good deal of rushing and tearing about. But it is amazing what can be done in a couple of days, and Monday's opening found the Section in pretty good trim. The show seems well up to pre-war standards—if not better. Certainly some of the arrangements at Castle Bromwich have been improved; they are not so obviously "temporary" as they used to be.

* * *

One cannot help admiring the pertinacity of the Ministry of Fuel officials in their determination to keep abreast of the current thermometer reading. The space-heating ban was due to operate from last Monday. But at the week-end temperature fell (as it does every other day) and so it was decided that the restrictions would be suspended so far as a number of counties were concerned—very annoying for the borderline cases. Can I make one more appeal to these assiduous servants of the public to leave these things to the public's common sense? Extremely few people are silly enough to waste fuel and money on unnecessary heating and certainly industrial managements are not.

* * *

With the immersion type element now almost exclusively adopted for water heating in this country I was interested to see that a rival method is now making its appearance in America. In the latest General Electric thermal storage heaters ribbons of "Calrod Heat-Wrap" conduction units, as they are called, completely surround the tank. There is no air space between the elements and the tank so that no heat is wasted and with the elements removed from the water scaling is largely eliminated. "Fiberglas" blankets are used to insulate the tank. Another innovation designed to increase the life of an ordinary galvanized tank is a special magnesium-alloy tube which can be readily fitted in the draw-off outlet. The idea of external elements is of course not new and before the war there were on the market elements designed both for clamping and belting on to the tank. External elements are also used extensively for industrial purposes.

* * *

There is a lighter side to the Bankside power station dispute. A correspondent to the *Evening Standard* asks:—

> "Why burn oil or put up chimneys on the power station to be built opposite St. Paul's? Power (gallons of it) is flowing past in the Thames. Why not make it a hydro-electric power station?"

"Beachcomber" in the *Daily Express* publishes the following letter (not too genuine I fear):—

> "Why could not the proposed Bankside power-station be a replica of St. Paul's, so as not to clash with the original? Alternatively, could not St. Paul's be very carefully moved to some other site? My niece, who is married to an electrician, says that he once suggested this to an architect, when it was a question of chimneys near a railway. But nothing was done."

* * *

Traditionally, speeches at the functions of the Association of the Supervising Electrical Engineers are brief and very much to the point and at this year's function the example set by Mr. H. Nimmo, the president, was followed by other speakers. Of most immediate importance were the views forcefully expressed by Miss Caroline Haslett, which supported the comments in the *Electrical Review* of April 25th, about the reimposition of the purchase tax on some items of domestic electrical equipment which consume very little current. Neither fuel economy nor saving in demand is enough to justify the deprivation this involves.

* * *

According to the *Sunday Dispatch* a campaign to do away with Sunday cooking is being launched by the Lord's Day Observance Society. The society estimates that a 25 per cent cut in gas and electricity could be achieved if "Christian women who are occupied in preparing hot Sunday dinners and thereby needlessly violating the fourth Commandment" would cease cooking on Sundays.

REFLECTOR.

Continuous Maximum Rating

Advantages in Relation to Electric Motors

By A. N. D. Kerr, A.M.I.E.E.

THE most popular type of motor in industry to-day is the totally enclosed fan cooled machine. Originally built for dusty and dirty situations it has gradually supplanted the protected type motor for many applications and its increasing use confirms its adequacy for a large number of industrial drives.

This is important—because such motors, being totally enclosed, have no sustained overload capacity, being capable merely of momentary overload. In other words such machines are designed, not on a load plus sustained overload basis, but on the basis of their continuous maximum rating. From this it will be seen that sustained overload capacity, as a normal feature, is not required by industry in an increasing number of applications.

Therefore it is suggested that it may now be desirable to revise British Standard 168: 1936 which deals with the electrical performance of industrial electric motors and generators of ratings of one H.P. per 1,000 r.p.m. and upwards and is on a load plus overload basis.

Fractional-horse-power motors to B.S. 170 : 1939 are already built on the basis of continuous maximum rating, the permitted overload figure of 25 per cent for five minutes being treated as momentary excess torque, whilst as regards machines larger than those covered by B.S. 168 there are two specifications, one for each type of rating. Thus the basis of continuous maximum rating applies already to small and large machines and might therefore reasonably be extended to include medium-size motors, which comprise the bulk of the market.

To enable the present position to be appreciated the requirements of B.S. 168 as regards overload capacity are set out below.

An overload is any load in excess of the rating and may be either momentary or sustained. A momentary overload is an overload the duration of which is so short as not to affect appreciably the temperature of the machine. Then the Standard gives values of such overloads in terms of excess torque, making it clear that these values are intended as a check on the ability of the machine to withstand such overload without injury. It is not intended that they should govern protective devices in the control gear and in practice higher momentary overloads are usually obtained without detriment to the motor.

For continuously rated motors these momentary overloads are 50 per cent for one minute and 100 per cent for 15 seconds. For short-time-rated motors there is only one value, 100 per cent for 30 seconds.

These values are based on normal service conditions which are defined as a temperature of cooling air not exceeding 40 deg C and an altitude not exceeding 3,300 ft above sea level. A sustained overload is an overload sustained for a period sufficiently long to affect appreciably the temperature of the machine and is applicable only when the cooling air temperature does not exceed 35 deg C. These values, which vary with output, are as follows:—

Motors with continuous rating (not totally enclosed), 25 per cent overload in torque for two hours for 10 H.P. and upwards per 1,000 r.p.m., for half an hour below 10 H.P. per 1,000 r.p.m. and down to 4 H.P. per 1,000 r.p.m. for 15 minutes below 4 H.P. per 1,000 r.p.m. and down to 1 H.P. per 1,000 r.p.m.

From this we see that the following machines have no sustained overload capacity: All totally enclosed motors; all short-time-rated motors; all other motors, irrespective of rating or enclosure, working in an ambient air temperature higher than 95 deg F.

The first exception includes an increasing number of industrial electric motors; the second includes crane, lift, hoist and other intermittent-duty applications; and the third includes all motors for use in extremely hot climates. None of these machines has a sustained overload capacity unless specially de-rated (which is rarely required).

In view of these exceptions it is evident that a large number of drives are already using motors on the basis of their maximum rating and it is difficult to name any industrial drive where sustained overload capacity is specifically necessary.

However, such capacity may still be needed in the marine market, as it is stipulated in the

Rules for Electric Propelling Machinery and Electrical Equipment, published by Lloyd's Register of Shipping (1945 Edition, Appendix 3). This stipulation could, however, be catered for by making sustained overload capacity in the British Standard permissive rather than mandatory, taking it out of Appendix B and incorporating it as an additional rating under Section 6, Classes of Rating.

Support for this view may be found in the American Standard "Rotating Electrical Machinery" (ASA–C50–1943) where Clause 2,035 for d.c. machines, reads "Continuous with two-hour 25 per cent overload rating of a generator. The continuous with two-hour 25 per cent overload rating of a generator defines the load which can be carried continuously, immediately followed by a 25 per cent overload for two hours, without causing any of the limitations established herein to be exceeded." This rating is in addition to continuous, nominal and short-time ratings.

In this connection it may be observed that it is only with d.c. generating plant that such sustained overload capacity is ever likely to be needed.

Summary of Advantages

To sum up, the advantages that would accrue from a general change to continuous maximum rating are: It would harmonize the requirements of the British Standard with the needs of industry, which has found, by its increasing use of totally enclosed motors, that it does not require the load-plus-overload basis.

It would reduce over-motoring of drives. A more careful matching of motors and load (by reducing the margin of overload capacity available) would improve the power factor, with benefits to both factory and supply distribution systems. A better power factor, by improving the voltage regulation, would enable higher outputs to be obtained on load, so making unnecessary the wide margins of electric motor capacity to the load requirements which are now normal on many drives.

It would enable the British manufacturer to compete more effectively in those export markets which at present do not use totally enclosed machines to the same extent as they use other types. We should then be able to build machines to a specification similar to that used by United States and Continental makers, whose products have, in general, proved adequate to market requirements, thus showing that the higher standards of performance of British motors are not required.

Finally it would enable us to revise our ideas on rated output and overload capacity. We could then arrange motor performance to be more consistent with load demands, permitting machines to work up to their maximum safe capacity when required to do so, and yet, under normal service conditions, to have an ample margin of overload capacity available.

Australian Electrical Manufacture

OFFICIAL statistics of Australian manufacturing production during the year 1943-44 have recently been issued. Those relating to the electrical engineering industries and apparatus are given in the accompanying table, together with such comparative figures for 1939-40 as are available. It will be seen that the concluding groups "neon signs, etc." and "other electric articles," were far greater in 1939-40 than in 1943-44, mainly no doubt because in the latter period separate valuations are given to several items which in 1939-40 would have been lumped together among "other electrical articles." Comparison is vitiated also by the general rise in prices between the two periods.

Class	1939-40 £A	1943-44 £A
Alternators	13,950	412,000
Generators	12,720	325,000
Motors, a.c.	410,500	719,000
Motors, d.c.	67,350	222,000
Transformers and convertors:		
Above 20 kVA—		
For use in supplying industrial power and light	313,000	428,000
For other industrial use	*	22,000
Below 20 kVA—		
For use in neon signs	117,900	193,900
Batteries, dry	*	471,000
Batteries, wet	*	761,000
Accumulators (automobile, radio)	533,000	782,000
Lamps	*	35,900
Telegraph and telephone apparatus	65,800	1,368,000
Regulating, starting and controlling apparatus	594,800	1,128,000
Electric cables and wire	*	1,336,000
Electric meters	*	56,300†
Household appliances (not exceeding 33 lb)	54,200	79,100
Household fittings (switches, etc.)	*	401,500
Electrical appliances and apparatus for motor vehicles, cycles, etc.	40,500	198,000
Stoves, ranges and cookers	32,000	*
Other domestic cooking apparatus	151,000	64,200
Refrigerators, household	475,000	408,000
Refrigerators, other		1,365,000
Heating apparatus	217,000	359,000
Neon signs, etc.	473,000	640,700
Other electrical articles	3,544,000	

* Figures not available. † Number.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

D.C. versus A.C.

THE letter from Herr Giesbers, published in your issue of April 25th, traverses part of the ground which Dr. Ehrensperger covers, in a reply to my article which he has very courteously sent me. My reply to this is being held back, at his request, until we have discussed things together. But, as Herr Giesbers has now sent in a communication I feel I ought to say something, or my silence may be misinterpreted.

I would say that I have drawn up a complete reply to both these gentlemen but, as my reply to Herr Giesbers would to some extent cut across that to Dr. Ehrensperger, I am holding it back for reconsideration.

Birmingham. A. M. TAYLOR.

Public Transport and the Trolley-bus

IN his letter in your issue of April 25th, Mr. J. S. Brownlie takes me to task for advocating the trolley-bus rather than the modern tramcar. I would stress the term "modern," for very few of the 7,000 tramcars now operating in Great Britain can in any sense be so described, and I question if there are any, besides the experimental car at Blackpool, which can accelerate at 4·5 m.p.h. per sec. I do agree, however, that the latest American street car of the P.C.C. type represents a standard both in performance and comfort which is beyond comparison with the average tramcar still in use in this country; but the question at issue is whether our tramcars, most of which need replacing, are to be superseded by modern tramcars, trolley-buses or motor-buses.

Where traffic is heavy the tramcar has certain advantages over other forms of road transport, but to take full advantage of its qualities it needs wide streets and/or private track. Where such conditions prevail, as they commonly do in the United States, the tramway becomes in effect, an electric railway. Unfortunately, in Great Britain we are hampered by narrow streets where tramcars do, without question, increase traffic congestion and there are comparatively few places where trams operate on private track. Some exceptions are Glasgow, Leeds and Liverpool, where trams are still usefully employed, though even Glasgow, for long a tramway stronghold, is to install trolley-buses.

I contend therefore that conditions in Great Britain are not suitable, as they are in America, for the widespread development of modern tramcars of the P.C.C. type and this opinion is confirmed by the whole trend of events during recent years.

There is a further very strong deterrent to the development of the tramcar in this country. The track in most places is in very poor condition and would require complete replacement if the advantages of the modern street car were to be obtained. Such replacement would be almost impossible due to the present shortage of steel and the heavy cost. The general policy therefore of operators in Great Britain to adopt an alternative to tramcars is dictated by practical and economic considerations and is not due to prejudice against the tramcar as such.

It is surely most significant that in the United States, the home of the modern tramcar, the trolley-bus is enjoying a tremendous boom and numbers have already outstripped the total in service here.

Rugby. J. H. CANSDALE.

Engineering Calculations

THE article "Engineering Calculations" in your issue of April 18th proposes a new unit of length because of alleged confusion over the quantities mass and force; but surely the artifice of changing the unit of length so that "g" can be omitted from our equations without altering the numerical result can only lessen the student's chance of really understanding what he is doing. It certainly does not enable "the young student to go ahead with the formulæ of dynamics in their mathematical form" since these inevitably contain "g" whatever the units used.

Mr. Sandeman's opening statement that confusion arises "through the language having only one word 'lb' for both mass and weight, bulk and force" is quite erroneous. The poundal and dyne are well-known units of force and the gram an equally well-known unit of mass. I know of no unit of bulk.

The confusion which sometimes arises in the young student's mind is mostly due to inadequate teaching, resulting in a lack of understanding of the difference between mass, weight and force. To avoid this con-

fusion one must keep clearly in mind the difference in dimensions of the quantities mass and force and this is greatly helped by the corresponding units having different names. To have one and the same name for the units of mass and force can but increase the confusion, although it undoubtedly would enable a student to do certain calculations without understanding what he was doing.

It is a very useful exercise for the student to be made to check the dimensions of the answer to his calculation, but he could hardly do this when his pound is sometimes a unit of mass and sometimes a unit of force, and further, he is taught that it does not matter which it is provided that his lengths are measured in gravits.

Finally, if real difficulty is experienced in dealing with mass and force, I recommend the Stroud system of units, but please preserve us from a unit of length that varies with latitude!

Ealing, W.5. J. H. COZENS.

I HAVE read with dismay the contribution of Mr. D. G. Sandeman in your issue of April 18th, in which he proposes a new unit of length. Heaven preserve us from these efforts to mystify and confuse the young idea!

The matter is perfectly simple and fundamental and I suggest that the staff of our technical colleges would be better employed if they really made certain that Newton's second law of motion was properly understood and could be correctly applied from first principles. So much of our teaching is based on "pocket-book" principles and too many know only a "formula," which is usually quite devoid of units, and it is little wonder in these circumstances that such artifices as "gravits" are put forward. The "gravit," however, is no more acceptable as a unit of measurement than is the poundal as a unit of force and was doomed before it was born.

No! two wrongs never made a right and Mr. Sandeman's suggestion is a confession of failure to teach first principles.

"NAVAL CONSTRUCTOR."

B.I.F. Space Limitation

THE British Industries Fair will be a valuable help to the export drive by acquainting overseas buyers with the quality of British goods. May I suggest that it might have been of even greater value if it had not been organized on such a restricted scale?

In the heavy industries section alone, space limitations have, I understand, prevented over 200 firms, many of whom have much to offer to foreign customers, from exhibiting.

Two of the companies in our group provide a case in point. They manufacture a variety of engineering products—mobile cranes, petrol engines, air compressors, steam engines, etc.—some of which they are able to offer for early delivery. Why should they be denied a position in "Britain's Shop Window" at a time when an increase in exports is of paramount urgency?

London, W.12. CYRIL M. COHEN,
Chairman and Managing Director,
George Cohen Sons & Co., Ltd.

Testing Relays

IN his article in your issue of April 25th Mr. T. A. Ledward stated in his preliminary remarks regarding overcurrent relays that "the minimum operating current is 30 per cent above normal full load when the tapping plug is set at 100 per cent," thereby creating the impression that the relay does not start to move until the current rises to 130 per cent.

Actually this is not so. The relay is stable at its full-load current, but starts to move if this current is increased very slightly. The increase necessary is by no means as much as 30 per cent and relays have been known to operate easily with a current only 5 per cent in excess of full load, although they do not conform to the characteristic curve at this current. This is presumably due to bearing friction and control-spring torque varying very slightly.

The author was presumably referring to the type of relay having the characteristic shown in fig. 1 of the article, in which case the plug setting multiplier value of 1·3 is the starting point of the curve on the relay dial plate and not "the minimum operating current."

Erith. A. J. BUTLER.

[Mr. Ledward agrees that our correspondent is correct in pointing out that the value he gave for minimum operating current is not a true minimum. It is, however, the minimum current at which reliable operation may be assumed. To be strictly accurate, he should have said that the relay is stable at normal full load, but will operate in 30 sec. when the current is 30 per cent in excess of full load. At current values between full load and 30 per cent overload, the relay cannot be relied upon either to operate in a given time or to remain stable, so that this part of the operating curve is useless.—Editors, *Electrical Review.*]

Bankside Power Station

Mr. Randall's Reply to Critics

IN a letter to *The Times* last week Mr. H. J. Randall, managing director of the City of London Electric Lighting Co., Ltd., replied to correspondence which has appeared in that newspaper upon the subject of the proposed new power station at Bankside, Southwark.

He first pointed out that the decision to erect the station was not hurriedly arrived at. The matter had been under discussion for two and a half years and formed the subject of a five-day public inquiry in January. At this inquiry evidence was heard from the City of London Corporation, the London County Council, the Southwark Borough Council and the Central Electricity Board and Mr. Randall's own company. No representations were made by the Dean and Chapter of St. Paul's Cathedral. Since the inquiry the matter had been considered at " a very high level " and the Government had decided that the 55-year-old Bankside station must be replaced by one of greater capacity, burning oil instead of coal.

Misapprehension Corrected

It was not correct, as had been stated by the Professor of Architecture at London University, that " condensers 200 ft high would tower above the city " and that smoke would obscure St. Paul's. The most up-to-date boiler-combustion processes and gas-washing plant would be employed. Mr. Randall did not agree that the station would interfere with the L.C.C.'s scheme for the south bank of the river. Only slight modification needed to be made in the scheme and there was no reason why flats and offices should not be built in the immediate neighbourhood. The scheme ought to conform with the requirements of the nation, but as it made no reference to a provision for generating stations in the very large Greater London area it could not be considered comprehensive.

Mr. Randall stressed the urgent need for more electric power to prevent the recurrence of crises such as that through which we had just passed and said that in the London district alone five new generating stations would be needed during the next few years and they must be built on large areas of land on the banks of rivers. The only practicable site immediately available was that at Bankside. A station on the alternative site at Rotherhithe would not be available for two winters later than the one at Bankside and in any event the Central Electricity Board considered that both sites, in addition to others, would be needed before London's increasing demand could be met.

The City of London Electric Lighting Co. was determined to make the station a worthy addition to London's architecture and had secured the services and enthusiastic co-operation of Sir Giles Gilbert Scott. The use of oil fuel would reduce the height of the buildings to 90 ft from the 140 ft which coal burning would necessitate. If the building of flats and offices were proceeded with under the L.C.C. plan they would no doubt be built to the permitted height of 100 ft. Thus the main body of the station would be less likely to interfere with the view of St. Paul's than these. It was possible that now only one chimney would be erected.

The new station would be widely separated from St. Paul's and intervening buildings. The Cathedral was built on land which was 40 ft higher than the Bankside site. The nave was about 120 ft high so that the roof level, apart from the dome, would be 70 ft above the power station buildings. The maximum height of the chimney would be 300 ft, which would be about 105 ft below the top of the dome and the chimney might be lower still. In those circumstances, Mr. Randall asked how the station could possibly dwarf or affect the predominance of the Cathedral. He also pointed out that the buildings would be set back 200 ft from the river frontage which would enable a wide roadway, a promenade and gardens to be constructed. This would afford a view of the Cathedral which had not been obtainable for perhaps two hundred years.

A scale model of the area was being produced as rapidly as possible and this would show the whole project in its correct perspective. Mr. Randall concluded his letter with an assurance that it was his company's desire that this urgently-needed station should increase rather than detract from the amenities of central London and he was confident that with the co-operation of the authorities chiefly concerned, this would be achieved.

Sir Leonard Pearce's Statement

Following the publication of Mr. Randall's letter Dr. Charles Holden wrote to say that he and Professor Holford who gave evidence on behalf of the City of London at the inquiry, presented the case for St. Paul's " in no uncertain terms " with the authority of the Dean and Chapter.

In the same issue (May 5th) Sir Leonard Pearce (as the engineer responsible for the engineering design of the proposed station) replied to a statement that his evidence at the inquiry threw doubt on the earlier completion of the Bankside station as compared with one at Rotherhithe. Sir Leonard said that at Bankside building operations could begin forthwith whereas at Rotherhithe the site would first have to be obtained and various works carried out before building could be started. Any delays in the obtaining of plant would be

common to both sites but its erection could not be commenced until the buildings had reached a certain stage. It was therefore obvious that the serious delay in building operations which must inevitably occur at Rotherhithe would put back the completion date of the station as compared with Bankside.

All-Party Discussion

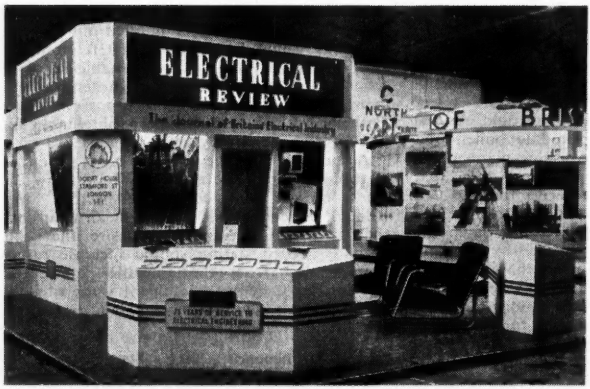
At the House of Commons on Monday Lord Samuel presided at a meeting representative of all parties which was addressed by Mr. Silkin, Minister of Town and Country Planning. Those present included the Lord Mayor of London and Mrs. Bolton, chairman of the L.C.C. Town Planning Committee.

Mr. Silkin put the case for the erection of the station at some length, and Mrs. Bolton replied on behalf of the opponents of the scheme. The meeting decided to ask Members of Parliament to give their support to a motion to be tabled in the House of Commons calling upon the Government to reconsider the approval of the scheme. It was also stated that those present would be prepared to support any organized protests made by outside bodies.

British Industries Fair

Representative Displays at Birmingham and London

ON Monday last the first post-war British Industries Fair opened at Castle Bromwich, Birmingham, and at Olympia and Earls Court, London, and by general consent the display is fully representative of all the principal branches of this country's industry and of a very high standard. The visitors have included a large number of home buyers but there has also been a satisfactory attendance of representatives from most of the world markets and it is reported that some substantial orders have been placed.



***Electrical Review* stand at the B.I.F., Birmingham**

Sir Stafford Cripps took the chair at a dinner held at the Mansion House, London, on Monday evening. In the course of his speech welcoming overseas buyers to the Fair, Sir Stafford said that they would be able to see for themselves that this country's industries were not in such a bad way as they had been led to believe.

The British Government was doing its utmost to stimulate export trade and for that reason had sponsored the Fair. With regard to prices, he said that British quotations had not risen to such an extent as the prices of goods which this country had to import. If the cost of imported materials continued to increase it would be impossible for British exporters to maintain stable prices.

Referring to delivery dates, Sir Stafford Cripps said that the general prospect varied from reasonable to good in the case of most products. In view of world conditions this could not be considered unsatisfactory.

A photograph of the *Electrical Review* stand at Castle Bromwich (C614) is reproduced with these notes and we repeat our invitation to electrical visitors to call and avail themselves of any assistance which our staff can give.

Our attention has been drawn to two omissions from the lists of exhibitors given in our last week's issue. William McGeoch & Co., Ltd., are showing at Birmingham (Stand No. C224) and Dawe Instruments, Ltd., are at Olympia (A1103).

Photography in Industry

An Exhibition of Applied Photography which opened on May 7th at Australia House, Strand, London and will continue until May 16th, Saturday and Sunday excluded, aims to show how photography is being used to solve problems in industry. Admission is by invitation cards obtainable from the Industrial Sales Department, Kodak, Ltd., Wealdstone, Harrow, Middlesex.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT the annual meeting of the Radio Industries Club held on April 29th **Mr. J. H. Williams** was elected president in succession to **Mr. L. C. Gamage**, and **Mr. H. de A. Donisthorpe** was re-elected chairman for the ensuing year.

Sir Edward Appleton, Secretary of the Department of Scientific and Industrial Research, has been awarded the honorary degree of D.Sc. by the University of Brussels and has been elected an honorary member of the Royal Belgian Society of Engineers and Industrialists.

Dr. P. Dunsheath, C.B.E., director and consulting engineer of W. T. Henley's Telegraph Works Co., Ltd., has arrived back in England, having travelled by air from Australia where he has carried out an extensive tour, including visits to Tasmania and New Zealand, during which he addressed overseas branches of the Institution of Electrical Engineers and members of corresponding institutions in the Dominions. During the tour, on which he was accompanied by Mrs. Dunsheath, he visited most of the principal power schemes, mining centres, engineering, shipbuilding and industrial concerns, and had interviews with many leading Government officials, engineers, principals of scientific bodies, universities, etc.

Three members of the staff of the Sun Electrical Co., Ltd., who are retiring on pension were entertained at a small informal dinner by the executive directors on April 29th at the Trocadero Restaurant, W. They were Miss M. I. Dewdney (personal secretary to the managing director since the inception of the company), Miss M. A. Tickner, assistant secretary (forty-five years' service) and Mr. A. J. Wood of the Motor and Plant Department (thirty-three years' service). Eleven departmental heads attended the dinner to bid au revoir to these veterans of the industry.

Sir George Nelson (chairman of Marconi's) opening the recent Marconi Jubilee Convention at Grosvenor House Hotel, London

Mr. T. R. Graty, A.M.I.E.E., until recently sales manager of the Traction Department of the Metropolitan-Vickers Electrical Co., Ltd., has been appointed special representative of this department and has set out on an extensive tour overseas with the object of concentrating attention on certain aspects of traction work in export markets. After serving for three years with the Bombay, Baroda and Central Indian Railway, Mr. Graty joined the Traction Department at Trafford Park in 1923 and was appointed assistant manager in 1932. In 1935 he became sales manager, and has been associated with a very large number of important traction contracts including the electrification of the Central Railway of Brazil.

Mr. T. R. Graty

Mr. A. E. Grimsdale

Mr. A. E. Grimsdale, B.Sc. (Eng.) Hons. London, has been appointed to succeed Mr. Graty as sales manager of the Metrovick Traction Department. Mr. Grimsdale was educated at Brighton Technical College and joined Metropolitan-Vickers as a special trainee in 1922, subsequently entering the Traction Control Engineering Department. In 1927 he went to Australia, where for three years he acted as resident engineer for the Sydney suburban electrification scheme. He was appointed trolley-bus sales engineer in 1932, and in 1941 became assistant to the manager of the M.-V. Attercliffe Works at Sheffield. In 1945 he returned to Trafford Park and was appointed deputy sales manager, Traction Department.

Mr. A. C. Stewart, A.M.I.E.E., has taken up the post of technical assistant with Jessop & Boydell, Ltd., of Bradford and Manchester, the Northern England representatives of Evershed & Vignoles, Ltd. Mr. Stewart obtained his technical education at Battersea Polytechnic, London, and was until recently a member of the

part-time teaching staff there. Before his war service in the Royal Navy, in which he served with the rank of electrical lieutenant commander, he was with the Electroflo Meters Co., Ltd., and Evershed & Vignoles, Ltd.

The General Electric Co., Ltd., held a staff dance recently at the Lyceum Theatre at which over 900 people attended. An enjoyable evening included "spot" and novelty prizes.

Sir Harry Railing (centre) and Lady Railing with Viscount Margesson at the G.E.C. staff dance

Among those who attended were Sir Harry Railing (chairman) and Lady Railing, Mr. and the Hon. Mrs. Leslie Gamage, and Viscount Margesson. The prizes were distributed by Mrs. Gamage.

Major General L. B. Nicholls, who was General Eisenhower's Chief Signal Officer and is now a director of Cable & Wireless, Ltd. is visiting the Middle and Far East to plan the development of civil communications.

Major F. W. Cundiff, has been appointed a director of the National Gas & Oil Engine Co., Ltd.

Mr. H. B. R. Powell has been re-elected president of the North East Coast Institution of Engineers and Shipbuilders.

Mr. J. S. Clark and **Mr. H. Chisholm** have been appointed joint deputy managing directors of A. C. Cossor, Ltd.

Mr. M. Raymond, managing director of Raymond Electric, Ltd., of Perivale, Middlesex, is flying to America on May 13th for six weeks. He will be meeting a number of executives of both American and Canadian radio and valve manufacturers to discuss and study the latest methods of manufacture, design and research in the electronic field.

Sir Frederick Bain, M.C., has been elected president of the Federation of British Industries in the place of Sir Clive Baillieu, K.B.E., who retires after two years in that office. Sir Frederick Bain is a deputy-chairman of Imperial Chemical Industries, Ltd., and during Sir Clive Baillieu's recent visit to South Africa, acted as president.

The Press Association "understands on good authority" that **Lord Citrine** is to be succeeded as a member of the National Coal Board by **Sir Joseph Hallsworth,** a former chairman of the Trades Union Congress.

Mr. J. L. Bates, deputy borough electrical engineer and manager at Grimsby, has been appointed borough electrical engineer of Reading. Mr. Bates was born and educated at Nuneaton, where he also served as an articled pupil of a former borough electrical engineer, Mr. S. C. Gibson, and afterwards was appointed mains assistant in the Electricity Department. In 1928 he joined the Leicestershire & Warwickshire Electric Power Co. as mains assistant and was promoted to district engineer in 1931. He went to Grimsby as distribution engineer in 1937, being appointed to his present position in 1943.

Mr. R. Gregory, who has been electrical engineer to the Mold (North Wales) Urban District Council for the past twenty years, has just retired. He was the Council's first electrical engineer.

Mr. F. W. Brecknell, electrical engineer to the Birkenhead Corporation since 1941, is due to retire on October 3rd. He entered the Electricity Department in 1900 as switchboard attendant, and in 1926 was appointed deputy electrical engineer.

Mr. D. J. W. Harvey, M.I.E.E., is to take up the appointment of chief electrical engineer for Fife and Clackmannan under the National Coal Board at the beginning of June. Going to Kirkcaldy in 1939 as mains superintendent, Mr. Harvey later became deputy electrical engineer. In 1943 he was appointed chief electrical engineer at Kirkcaldy. Mr. Harvey was previously with Edinburgh Electricity Department.

Mr. F. Marsden, assistant distribution engineer with the Settle & District Electricity Co., Ltd., has been appointed engineering assistant (electrical) in the Architect's Department of the East Riding County Council, Beverley. He takes up his new duties on May 19th.

Mr. E. J. Steadman, B.Sc., A.Inst.P., has joined Watson & Sons (Electro-Medical), Ltd., as engineer-in-charge of their technical section. Mr. Steadman was educated at Framlingham College and London University, and joined the staff of the G.E.C. Research Laboratories in 1933. In 1937 he transferred to the Watson X-ray section at the G.E.C. Union Works, North Wembley, and became chief engineer.

In 1946 he was appointed technical officer with the British Standards Institution.

Mr. **J. H. Asdell,** hon. secretary of the Birmingham Electric Club, is retiring from that office and the Council proposes to present him with a memento of his long and devoted service to the Club. Subscriptions (maximum 5s.) should be sent to the hon. treasurer (Mr. Bird) or the hon. social secretary (Mr. Frater) not later than May 31st.

Mr. **H. R. Denne** has been appointed television outside service engineer with E. K. Cole, Ltd., operating from their main service department, Somerton Works, Southend-on-Sea.

Mr. **R. W. C. Stebbings,** acting manager, has been appointed manager of the Suffolk Division of the East Anglian Electric Supply Co., Ltd. Lt. Col. **A. E. Knights,** who was formerly resident manager at Bury St. Edmunds, is appointed manager of the Norfolk Division, being succeeded at Bury St. Edmunds by Mr. **F. A. Moinet** (Isle of Wight Electric Light & Power Co., Ltd.), and **Mr. S. C. F. Whitmore,** formerly of Stowmarket, takes up the position of manager of the Essex Division.

Mr. **B. A. Nicholls** of the East Anglian Electric Supply Co., Ltd., has been appointed assistant mains engineer with the Peterborough Corporation Electricity Department.

When the centenary of Alexander Hawkins & Sons, Ltd., electrical engineers and contractors, of Southwark, S.E.1, occurred in 1944 many of the staff were serving in the Forces, and the celebration dinner was postponed. The event took place last week at the Elephant and Castle Restaurant, thirty-three members of the staff being present. During the evening presentations were made to eleven of the staff who had served for periods ranging from fifteen to fifty-seven years.

A dinner was recently held at the Swan Hotel, Leighton Buzzard, to celebrate the "coming of age" of Griffin Bros., Electrical, Ltd., electrical contractors (of which Messrs. R. J., J. A., and H. G. Griffin are directors). The whole of the staff and their families were invited and during the evening there was dancing alternating with musical items by the directorate and members of the staff.

Mr. J. D. Speakman, Major M. N. T. Gubbins and Mr. M. H. Stothert, directors, were present at the annual social evening of Sutcliffe, Speakman & Co., Ltd., on April 15th, when about 500 employees were entertained to supper in the Co-operative Hall, Leigh.

The opening meeting of the season of the Lancashire & Cheshire Radio and Electrical Golfing Society was held at the Warrington Golf Club, Stockton Heath, on April 30th, under the captaincy of Mr. G. C. Cooper. The main competition was the 18-hole medal for the Founder's Cup for which there were thirty-eight entrants. The winner was Mr. G. Smallman of Manchester, who is the Manchester and East Lancashire representative of Electrical Components, Ltd. The subsidiary competition, 9-hole greensome against bogey for prizes presented by the Society, was won by Messrs. C. P. Woods and C. Ditchfield both of Bolton.

Obituary

Mr. J. E. Rutter.—The death occurred on April 22nd of Mr. J. E. Rutter, the inventor of the composite wooden pole which bears his name. Mr. Rutter, who was district engineer with the London and North-Eastern Railway, carried out tests with Mr. Christopher Wade, in 1922-23 upon wooden poles and their foundations for E.R.A. The results were dealt with in a paper read before the I.E.E. by the late Mr. W. B. Woodhouse of the Yorkshire Electric Power Co. Mr. Rutter also edited the 1926 edition of "Wade's Tables."

Mr. F. W. H. Wheadon, managing director of the Adelaide Electric Supply Co., Ltd., whose death was reported in our last issue, went to Australia in 1899 as resident engineer of the South Australian Electric Light & Motive Power Co., for whom he supervised the erection of the old Grenfell Street Works. When the company was taken over by the Electric Light & Traction Co. of Australia, Ltd., in 1900 he continued as resident engineer. This company in turn was sold to the Adelaide Electric Supply Co., Ltd., in 1904 and in 1914 Mr. Wheadon became engineer and manager. He was appointed managing director in 1923 and was principally responsible for the Osborne "A" station and the Osborne "B" plant which he did not live to see put into commission.

The late Mr. F. W. H. Wheadon

Mr. Wheadon was very prominent in electricity supply affairs in Australia and was a founder member of the Electricity Supply Association of Australia. He visited England and the Continent in 1904, 1912, 1925 and 1933 and the United States and Canada in 1916, to keep abreast with technical development throughout the world. He represented the Standards Association of Australia at the International High Tension Conference in Paris in 1925.

Mr. M. Insull.—The death is reported from Orillia, Ontario, of Mr. Martin Insull, the brother of the late Mr. Samuel Insull with whom he was closely associated in the large-scale organization of electricity supply concerns in the United States.

Indian H.V. Laboratory

Extension of Existing Facilities

By V. S. Swaminathan, M.A., M.Sc.(Lond.)

IN 1926 a high-voltage laboratory was established at the Department of Electrical Technology at the Indian Institute of Science, Bangalore, through the foresight of the late Professor Catterson Smith. It occupied a floor space of 40 by 32 ft with an effective height of 30 ft and was equipped to meet developments during the next ten to fifteen years. Ten years ago an impulse generator on the Marx principle, constructed by the staff, was added to the equipment. Facilities are now available for a.c. power-frequency tests up to 220 kV, d.c. tests up to 110 kV and impulse tests up to 500 kV.

Laboratory training has been given to students qualifying for certificates of proficiency in electrical technology, thus inaugurating high-voltage engineering research in India on problems pertaining to the breakdown of solid and liquid dielectrics, voltage gradient in suspension insulator strings, etc. The laboratory has also been used by supply undertakings, Government bodies and commercial firms and has encouraged the growth of electrical industries, e.g., the porcelain factory at Bangalore.

Central Technical Power Board

Of late, power schemes to give 800,000 kW or more have either been sanctioned or are under way for commission by 1953. The transmission voltage is 132 kV in one project. A Central Technical Power Board has been created to co-ordinate the administration of electricity service on an all-India basis. Hydro-electric surveys, thermal power investigations, co-ordination of generation and transmission, standardization of voltage and frequency, interlinking of regional grids, formation of a continental grid system, planning of electrical and electro-chemical industries and establishment of electrical research are some of the subjects directly coming under the Board's purview. A pressing need is to add an up-to-date high-voltage laboratory to existing facilities. The inclusion of an a.c. calculating board is envisaged.

The new equipment is being installed in the main laboratory on a floor space 130 by 116 ft with a height of 64 ft with galleries, research and other rooms. It includes a high-voltage impulse generator with a maximum crest voltage of 3,000 kV, impulse energy of 45 kW-sec and wave shapes of 1×5, 1×10 and $1\frac{1}{4}\times40$ micro-sec; cathode-ray oscillograph (demountable type); heavy-current impulse generator for maximum surge current of 70,000 A; three 350-kV (secondary) testing transformers, cascade-connected to give 1,050 kV, r.m.s. to earth at 50 cycles; sphere-gap for measuring higher voltages up to 3,000 kV; electrostatic voltmeter for measuring d.c. and a.c. voltages from 30 to 500 kV; two-valve d.c. testing equipment capable of maximum d.c. output of 200 kV; high-frequency oscillator (with output of 125 kV, 200 kc/s); a.c. bridge for maximum working voltage of 300 kV at power frequency; crystal-controlled oscillators and r.f. amplifier systems capable of giving 100 kV at frequencies from 500 to 1,000 kc/s; apparatus for measuring dielectric constant and power loss of insulating materials with a range of from 1 to 50 kc/s; equipment for ascertaining sludge-forming tendency and acidity according to B.S.S. 148; and sets for corona testing.

The a.c. network calculator likely to be most useful for India would contain 18 generators, 120 line units, 56 load units, 50 capacitors, 18 auto-transformer units, 30 equivalent Pi-line impedance units and 8 mutual-reactance transformers. The new laboratory is expected to start functioning next year.

I.E.E. Radio Section

THE Radio Section of the Institution of Electrical Engineers held its dinner on April 30th, at the Café Royal, London. The President, Mr. V. Z. de Ferranti, was prevented from attending but was represented in his absence by Mr. P. Good. During the evening the chairman of the Section, Prof. Willis Jackson, announced that Mr. Nunn was handing over the secretaryship of the Section to Mr. K. W. T. Brown. A presentation to Mr. Nunn of a pipe, a well filled tobacco box and a cheque was made by the chairman as a token of the appreciation of members of the services he had rendered during his term of office.

Industry and the House

Generating Plant Questions

By F. J. Erroll, M.A., A.M.I.E.E., M.P.

TOO little generating plant, too many appliances—that once again has been the theme of electricity in Parliament this last fortnight, culminating in the two debates on May 1st (ominous date?) on the fuel situation in general and the new Fuel Order limiting the use of electricity and gas during the summer.

A somewhat dubious aspect of the first part of the problem has been the several exchanges on imports and exports of generating plant. It all started with a question to the Board of Trade by Mr. W. Shepherd as to the number and price of generating plants sent to Poland this year. In January and February, answered Mr. Belcher, 96 tons of electric generators were exported to Poland, valued at £40,800. The following day, Major P. G. Roberts put the question against a wider background by asking why £5 million of electrical equipment was exported in February, nearly £2 million more than in 1946, and what representations had been received from the Minister of Fuel on the subject, in view of the present deficiency of electrical equipment. The striking reply of Mr. Belcher was that no representations had been received from the Minister of Fuel.

Export of Generator Parts

Another question from Major Roberts on the next day narrowed the issue. The export of generator parts, he pointed out, rose from £37,000 in January to £237,000 in February. What percentage of the latter figure represented parts unsuitable for use in Great Britain? Mr. Belcher, who on his own admission had received no representations from the Ministry of Fuel, said that so far as he was aware there had been no hold-up in the supply of generator parts for power stations in this country on account of exports.

Meanwhile Mr. Shinwell announces that an interim report has been received from the special mission which recently visited Germany to inspect power station plant; and the question of importing power station equipment from that country is now being examined. And Mr. Wilmot says it is hoped to expand United Kingdom production of electrical steel sheets by over one-third by the end of this year, and to import substantial quantities from the United States, Germany and Belgium.

While I am well aware that power station plant is not necessarily interchangeable, that goods made for export are not necessarily suitable for use at home, and that an international division of labour is a healthy system, I cannot help wondering whether these questions and answers suggest once again a lack of adequate consultation and co-ordination between departments. The pursuit of different objectives by different Ministries will never add up to a plan, and in the provision of adequate generating plant we desperately need true co-ordination.

Heavy Plant Committee

Mr. Ellis Smith, for example, has been asking what type of priority has been given to electric power plant and power house construction and what happened when the Ministry of Supply met representatives of the plant manufacturing industry. Mr. Wilmot states that four meetings of the Heavy Electrical Plant Committee were held in 1946 and two had since been held under his chairmanship. A progressing organization had been set up to help manufacturers overcome production difficulties. The highest priority had been given to the supply of labour and essential materials, and arrangements had been made to ensure that export orders did not interfere with home requirements. The latter assurance, though coming rather late in relation to the more specific questions and giving little hint of the nature of the "arrangements," which are being made may nevertheless hold some hope for more effective interdepartmental liaison in future.

The Bankside Controversy

The limelight on this subject has I suppose been stolen this month by the St. Paul's *v.* Bankside controversy. Into the æsthetic and town planning arguments I do not propose to enter, but there are a few technical points which have been obscured by the general furore. Mr. Silkin, for example, has

stated that one of the safeguards against the threat of dominance over St. Paul's is that the electricity is to be generated by oil. M.P.s were puzzled by this statement. Is it the intention to reduce the smoke output in this way and/or reduce the height of the smoke stacks? When I put a question to the Ministry of Fuel on this point, Mr. Gaitskell replied that in giving their consent to the erection of the new station, the Electricity Commissioners will stipulate that the most efficient methods for eliminating smoke should be used. Moreover, any emission of black smoke would be subject to the smoke nuisance provisions in the Public Health (London) Act, 1936, and the smoke by-laws. This is incidentally the second case of compulsory use of oil fuel, the first having been the Neasden power station of the L.P.T.B., to which I referred some months ago. In this particular case, it seems to be something of a red herring to distract the attention of M.P.s from the broader considerations.

Menai Straits Scheme

Before leaving generation for utilization, it may be mentioned that a question to Mr. Shinwell on the scheme for harnessing the water of the Menai Straits drew the statement that its merits could not be determined without a detailed survey and a tidal model. Capacity for making such models was limited, priority was being given to the Severn Barrage, and for the present therefore nothing could be done about the Menai Straits.

If regulations could warm us and cook our food there would be little to worry about. Entering fully into the spirit of the thing Mr. Raymond Blackburn has suggested that the sale of electric fires should be limited to persons setting up house for the first time, or for the replacement of existing fires, or special cases such as invalids. Mr. Gaitskell is to be congratulated on his reply: "This would require an elaborate and costly licensing system, the manpower for which we can ill afford in present circumstances." It is a pity something of the same logic has not been applied to the other "measures to restrict the consumption of electricity" to which Mr. Gaitskell went on to refer.

New Heating Restrictions

The country, I am sure, will echo the doubts felt on both sides of the House at the wisdom of introducing the new Control of Fuel (Restriction of Heating) Order, which prohibits the use of gas and electricity for space-heating during the summer months and, in the words of Socialist Mrs. Middleton, will "make the housewives of this country into a class of law breakers and law evaders." There was, I believe, a far more general degree of support than the division indicated for the statement of Mr. R. S. Hudson that "it would have been far better if the Minister had relied entirely on the voluntary principle."

To attempt, as the Minister of Fuel has done, to mix the voluntary with the compulsory principle is to betray a lack of understanding of the people of this country. There are occasions when it is wise to use an electric fire during the summer months and, despite this Order, people are going to use them on those occasions. In their own minds that will bring the whole prohibitory system into contempt and they will feel no moral compulsion to make good the power they have used by economy on other occasions. Whereas, had a general appeal been made to them to use as little as they can during the summer, they would have responded and taken care that their overall consumption was as limited as they could make it. This Order, on the Government's admission, will not be enforced, and to pass it, against the inner conscience of the House, is to invite disrespect for the law.

Purchase Tax on Appliances

On balance, probably, the Government was right to resist the pressure not to discriminate against electrical household appliances by means of purchase tax. The debate on this aspect of the Budget produced however a number of striking tributes to the effectiveness of electricity for cooking as well as evidence of special cases where the tax might be remitted. While accepting the former, Mr. Glenvil Hall made no response to the latter. To close on a note of harmony, two of the tributes are worth quoting. Said Mrs. Leah Manning: "The electric cooker is a piece of domestic apparatus which results in a considerable saving of fuel. It is one of the most economical forms of cooking. . . ." And, in reply, Mr. Glenvil Hall: "Quite obviously, electric cooking is much cleaner, and it is a modern method of heating and lighting as well . . . and the record of this Government has been to foster as far as it could the sale of these appliances since it first came into office."

PARLIAMENTARY NEWS

By Our Special Reporter

In the House of Commons, Mr. Blackburn asked the Minister of Fuel and Power whether he would consider limiting the sale of electric fires to persons setting up house for the first time, to the replacement of existing fires or to special cases such as invalids.

Mr. Gaitskell, Parliamentary Secretary to the Ministry, replied that the proposal would require an elaborate and costly licensing system the manpower for which we could ill afford. The measures to restrict the consumption of electricity recently announced by the Minister were regarded as being more effective in achieving the object in view.

New Fuel Order

After a controversial debate, the new Fuel Control Order was approved by 227 votes to 141—Government majority 86. Members on all sides of the House criticized the Order as being unworkable, as creating a new class of criminals, and as inflicting more hardship on the already overburdened housewife.

Mr. Gaitskell, replying to the debate, said that the electricity industry were opposed, as they always had been, to any form of statutory restriction. It was only natural, however, that people who had been concerned for years in pressing the sales of electricity should not be very enthusiastic about cutting down the demand. The Government took responsibility for making the ban statutory.

Mr. R. S. Hudson said that Mr. Gaitskell's statement was grossly unfair. Was it not a fact that the industry said that if a purely voluntary scheme was adopted they would do everything in its power to secure compliance with it and that they thought more would be saved that way?

Mr. Gaitskell said that the industry were against any form of statutory control. They always had been. They were in favour of voluntary efforts, but he was not saying that they were not prepared to co-operate. The new Order, he maintained, was no more unfair than the present system, under which there was no control of the domestic consumption of gas and electricity. Even though it would be difficult to enforce, it did not mean that the new Order was of no use. The Government had no power to force an entry into a private house, and did not intend to take that power. It had power in the case of business and industrial premises, and, sparingly and with discretion, that might have to be used. It was far better that people should know precisely where they were, and search warrants could be obtained if information were forthcoming of extravagant use of electricity. He had heard of cases of people who were not friendly to the present Government, going to great expense to burn electric fires. The Order was bound to depend to a very large extent on voluntary support and co-operation. There was power in the Order to license exceptional cases.

Meter Rents

Mr. Baker White asked the Minister of Fuel and Power, in view of the ban on domestic heating by gas and electricity, what arrangements he proposed to make in regard to the payment of meter rents in private and commercial premises using gas and electricity only for heating.

Mr. Shinwell said he did not propose to ask supply undertakings to make special arrangements in such cases since the undertakings had, in general, to meet the cost of providing and servicing meters.

Quality of Coal

Sir Waldron Smithers asked the Minister of Fuel and Power if his attention had been called to the nineteenth annual report of the Central Electricity Board in which reference was made to the increasing ash content of the coal supplied, resulting in a financial burden of £2,000,000 and loss of 380,000 kW, and what steps he was taking to remedy this matter. A similar question was put by Mr. Prescott.

Mr. Shinwell said the National Coal Board informed him that it was giving urgent consideration to the quality of coal marketed both as part of its long-term policy and its shorter term arrangements.

Mr. Hobson asked whether the Minister would consider allowing the electricity undertakings to buy coal according to its calorific value, as they did before, because it would prevent this gross wastage?

Mr. Shinwell replied that he would shortly set up an industrial consumers' council, as provided for in the Act of Parliament, which could deal with these matters.

In answer to Major Peter Roberts, Mr. Shinwell said he was advised by the Central Electricity Board that the average ash content of coal as received at generating stations under its control was 10·3 per cent in 1939 as compared with 13·3 per cent in 1945. A figure for 1946 was not yet available.

Boiler Conversion

Mr. Hobson asked the Minister of Fuel and Power if he would state the number of chain grate fired and pulverized fuel fired boilers in power stations that had been converted to oil fuel. Mr. Shinwell replied that none had been converted.

Mr. Hobson asked whether, in view of the

small amount of progress made in the conversion of water tube boilers to oil fuel, he would reconsider his decision, which was against the advice of the Central Electricity Board and was taking labour away from the production of new boilers and boilers in course of erection, and was saddling the electricity generating industry with heavy additional running costs.

Mr. Shinwell said he was not aware that this was against the advice of the Board. On the contrary, there had been close consultation with the Board. These matters had been dealt with by the Heavy Electrical Plant Committee of the Ministry of Supply.

Plant Extensions

Mr. Hobson asked the Minister of Fuel and Power if he would state the number of turbo-generators being erected in power stations in England and Wales and their total capacity.

Mr. Shinwell said that 24 turbo-generators, totalling 709,000 kW of installed capacity, were now in course of erection.

Water Power from Welsh Hills

Mr. Peter Freeman asked the Minister of Fuel and Power what steps were being taken to investigate the possibilities of increased electricity from the water supply of the Welsh hills; who were the members of the committee concerned; and when he proposed to issue a report.

Mr. Shinwell said that as a result of a full investigation by consulting engineers, several schemes had been put forward by the North Wales Power Co. for hydro-electric development in the Welsh hills. These were being examined by the Electricity Commissioners and the Central Electricity Board. In these circumstances he saw no need to appoint a committee.

Bankside Power Station

Mr. Erroll asked the Minister of Fuel and Power what would be the estimated annual additional operating cost of generating electricity through using oil fuel at the new Bankside power station.

Mr. Shinwell said that the increase in operating costs due to oil firing could not be assessed until the contract for the supply of oil had been made; the station would not be completed for about three years. The increase would be partly offset by savings in the cost of construction.

Central London Co-partnership

Mr. Palmer asked the Minister of Fuel and Power if he was aware that Central London Electricity, Ltd., had issued a notice to its employees stating that because of the Electricity Bill, on the advice of his Department, the directors had with reluctance been compelled to abandon their intention to reinstate the employees' co-partnership scheme. Would he give an assurance that company electricity undertakings governed by the provisions of the London Electricity Acts, 1925, were not debarred from making co-partnership, bonus or special payments to their officers and workpeople for the current year if they so wished; and that it was not intended by the legislation now before the House to make illegal normal co-partnership, bonus or special payments to officers and workpeople made before the vesting date.

Mr. Shinwell said that he was aware of the notice issued by Central London Electricity, Ltd., which had now been withdrawn. It was not issued on the advice of his Department and no letters were exchanged. The Electricity Bill now before Parliament did not in any way affect rights which had been created by co-partnership arrangements made in accordance with the London Electricity (No. 2) Act, 1925.

No Bill of Indemnity

Mr. Keeling asked the Minister of Fuel and Power whether it was intended to introduce a Bill of Indemnity to excuse electricity undertakings from penalties for suspending, at the request of the Government, the performance of their statutory obligations.

Mr. Shinwell said it was not. Asked whether the Government proposed to give any protection to electricity authorities who opened themselves to proceedings by cutting off electricity without any statutory authority, Mr. Shinwell replied that so far as he knew, they had not asked for it.

Electronic Calculating Machines

Mr. John Foster asked the Lord President of the Council whether, in view of the intricate calculations involved in modern planning and the difficulties of evaluating all the relevant factors, any giant electronic calculating machines were being constructed for use in Great Britain similar to the Mark I operating at Harvard University in the U.S.A. or the Mark II which was under construction for the U.S. Navy.

Mr. Morrison said that the two machines referred to were in fact not electronic but were operated by relays and no similar calculator was contemplated for this country. An electronic calculator which would operate at one thousand times the speed of these machines was being planned now at the National Physical Laboratory. When completed its services would be available to Government Departments, research establishments and industry.

Milk Pasteurized by R.F. Heating

RADIO-FREQUENCY heating is being used in a new method of pasteurizing milk developed by the Radio Corporation of America. It is described as " a continuous pasteurizing process which kills or deactivates all but one per cent of the bacteria that normally remain in milk under conventional methods of pasteurization." The milk, when being processed, is heated to a temperature of 200-205 deg F for one-tenth of a second. The chief limitation of the method is that it can only be used to produce homogenized milk. Bottled beer can also be pasteurized.

Electricity Bill

"Dissipation of Assets" : Arbitration Tribunal

THE Government hopes to complete the Committee stage of the Electricity Bill by the week before Whitsuntide. This announcement was made by Mr. Shinwell, Minister of Fuel and Power, when the Standing Committee resumed its deliberations last week.

Col. Clarke moved an amendment to Clause 25 (Reopening of Transactions Resulting in Dissipation of Assets) with the object, he said, of safeguarding the purchaser against any transactions made on bad terms because of impending nationalization, and also by trying to make the clause "less penal and less onerous altogether."

Sir Arnold Gridley asked the Minister to consider the clause from the point of view of directors, who, like himself, had to deal with these matters almost every day of the week. Electricity supply undertakings throughout the country were in an abnormal condition to-day. They were having to persuade their customers to adopt a complete reversal of policy, and to put down private plants to help take some load off the power station.

Reflection upon Directors

As he (Sir Arnold) understood it, in a later Clause, the Minister would provide that if there were any doubt about transactions the sanction of the Minister or of the Electricity Commissioners might first be obtained. He asked the Minister to consider this. To-day one was compelled to move men about from one part of one area to another, or to take on additional people. Frequently if a house suitable for housing an engineer suddenly came on the market a decision whether to buy it or not had to be arrived at immediately. One could not wait to send in an application to the Electricity Commissioners or to the Minister. Similarly, if additional factory space was required for say, a meter testing department, a decision must be arrived at immediately. He asked that transactions carried out in the ordinary course of business should never be questioned. The Government must rely on the honour and common sense of the directors of these concerns who had done nothing to deserve such a reflection on their honour and capacity.

Sir F. Soskice, the Solicitor-General, replying to Sir Arnold Gridley, said that the clause would not impose the hindrances he suspected. He urged hon. members not to be so suspicious of the clause, but to agree with him that there must be some method by which the State in acquiring the electricity concerns could be protected against the possibility of anything untoward happening. It would be grossly unfair on the part of the Minister, who was charged with protecting the public interest, if he did not include in the Bill some machinery of this sort, but by so doing there was no imputation against any particular person or persons. But he (the Solicitor-General) would look into the matter again.

The amendment was, by leave, withdrawn.

On Clause 27 (Establishment of Electricity Arbitration Tribunal), Mr. Boyd-Carpenter moved an amendment to enable, if thought necessary, a second division of the tribunal to be set up, and to enable matters which went to the tribunal to be dealt with by two courts instead of one. This, he said, would speed up the proceedings.

Sir F. Soskice said that the amendment was not really necessary, as the tribunal already had powers of delegation. But the Government would consider the matter further. The amendment was, by leave, withdrawn.

On Clause 28 (Procedure and Enforcement of Orders of Arbitration Tribunal), Mr. Gaitskell moved an amendment to give to any party to the proceedings a right of appeal on any question of law or fact from any determination or order of the arbitration tribunal. This clearly widened the scope for appeal. The amendment was agreed to.

On Clause 29 (Staff and Expenses of Arbitration Tribunal), Mr. Boyd-Carpenter asked whether it was the intention to pay tax-free allowances to members and officers of the tribunal, as he understood were paid in connection with other nationalized industries in which the Ministry of Fuel and Power was concerned. Something in the nature of a ramp was developing in this connection.

Mr. Gaitskell said that this clause simply covered nothing more than the ordinary travelling expenses which it was customary to pay to members of tribunals and so on. The Clause was agreed to.

Pre-Graduate Apprenticeship

IN a letter to *The Times*, Sir Arthur Fleming (chairman, I.E.E. Education Committee), referring to the difficulty of securing places in universities, suggested that students should first obtain practical training in appropriate industrial organizations. A year's break between school and university had for some time been advocated by the Institution of Electrical Engineers, whose advisory service was at the disposal of those seeking guidance. Deferment of military service would be granted to pre-graduate apprentices with further deferment not only for the university course (three years) but also for completion of their practical training (two years in the aggregate) after their graduation.

Electricity in the Highlands

CONSTRUCTIONAL Scheme No. 8—for the electrical development of Kintyre (Argyllshire)—has been published by the North of Scotland Hydro-Electric Board. It comprises a hydro-electric power station at Glen Lussa, containing two 1,000-kW turbo-alternators (344-ft head) and 90 miles of high-voltage and 29 miles of medium-voltage lines.

Two single-circuit 11-kV lines will connect the new station with the existing Diesel station of the Campbeltown & Mid-Argyll Electric Supply Co., Ltd., on the outskirts of Campbeltown. Thence an 11-kV line will pass through villages on the west coast (supplying 75 per cent of the population) to Tarbert, where it will link up with the company's Ardrishaig system. The east side of the peninsula is to be served by a 33-kV line with a further link to the western section. A reduction in tariff rates it is stated, will be made to existing consumers.

The average annual output of Glen Lussa is estimated at 8·5 million kWh. Water from a catchment area of 12 sq miles is to be impounded in a new loch 2 miles long and 450 ft above sea level, which will be 2¼ miles from the power station, and a concrete-arch dam 130 ft long and 40 ft high will be constructed. The more regular flow of water is expected to improve fishing. The scheme will cost £480,000 and will employ about 400 men at the peak.

Bury Undertaking's Jubilee

ON November 5th last the electricity supply undertaking at Bury reached its fiftieth anniversary, which event was celebrated on May 1st. At the evening function Mr. C. T. S. Arnett (district manager, C.E.B.) referred to the importance of coal in relation to electricity, which he believed would have effect for the next sixty years. No political bias, he urged, should prevent councillors or engineers from doing their best to serve the public. Alderman T. Evans (chairman of the Bury Electricity Committee for over twenty-one years) sketched the history of the undertaking, mentioning that the low cost of electricity had meant the introduction of new industries to the town. Last year, he said, land had been purchased to develop local industries and a site of 25 acres was available for power station extensions with ample supplies of condensing water near a projected new road.

A presentation of a gold watch and illuminated address was made by the Mayor (Alderman T. Taylor) to Mr. J. G. Potts, borough electrical engineer and manager from 1923 (following Mr. S. J. Watson, the first chief at Bury) until his retirement last February, when he was succeeded by Mr. J. Mills. Mr. Potts, who had been with the undertaking since 1910, stated that the number of consumers had risen from 1,600 in 1922 to more than 17,000, almost every house in the town now being connected. The Mayor of Bolton (Mr. H. W. Taylor) also spoke.

The area served by Bury undertaking covers 9 sq miles with a population of 57,000 and a bulk supply is also given to Heywood Corporation. Chamber Hall power station, which is adjacent to the River Irwell, started to supply in 1911 and is now a selected station containing two 10,000-kW and one 6,000-kW turbo-alternators, the latest unit operating with steam conditions of 300 lb per sq in. and 700 deg F. Output last year was 55 million kWh with a maximum demand of 22,000 kW. In 1945-46 the income from the sale of energy amounted to £228,000 and the net profit to about £6,000.

I.E.E. Benevolent Fund

APPLICATION has been made to the Board of Trade for a licence directing an association about to be formed under the name of "The Incorporated Benevolent Fund of the Institution of Electrical Engineers" to be registered with limited liability without the addition of the word "limited" to its name.

The objects as set out in the application are: "To assist pecuniarily or by the provision of residences or accommodation, furnished or unfurnished, and with or without any ancillary conveniences or amenities, free of charge or at low or nominal rentals, or in any other manner whatsoever which may be considered expedient necessitous members or former members of any class of the Institution of Electrical Engineers who have been members of the Institution for at least five years consecutively, and have paid their subscriptions to the Institution in respect of at least that period of membership, or compounded therefor, and the wives, widows, children, and other dependents of such members or former members of the Institution."

Electrodeposition Conference

AN international conference is to be held by the Electrodepositors' Technical Society from September 17th to 20th, with headquarters at the Hyde Park Hotel, Kensington. The first session will deal with the electrolytic polishing of metals (five papers), the second with miscellaneous processes and reports (seven papers), the third with electrodeposition processes (six papers) and the fourth with the structure of deposits (six papers). The authors represent Britain, Australia, Canada, India, U.S.A., France, Holland, and Italy, while practice in Germany, Switzerland and Sweden will also be reported upon. Works visits in London and the Midlands are being arranged and an exhibition at the conference hotel as well as buffet luncheons, dinner and dance. Forms of application are available from the conference secretary, Electrodepositors' Technical Society, 27, Islington High Street, London, N.1.

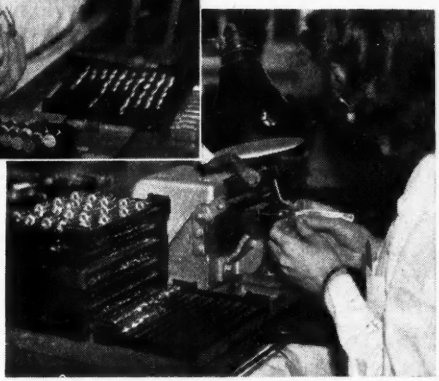
Overcoming Labour Shortage

Miniature Radio Valve Assembly

TO overcome the shortage of labour at its Mitcham works an interesting innovation has been introduced by the Mullard Radio Valve Co., Ltd. Components of miniature valves made at Mitcham are taken to a small new factory established at Gillingham, Kent, where labour is available, assembled there and then returned to Mitcham for completion. A van makes two journeys between the two works daily.

Since this new assembly feeder factory was opened last autumn about ten times the number of girls needed have applied for positions which require exceptionally high standards of manual dexterity and eyesight. One of the qualifications of applicants is ability to read extremely small type: the word "broadcasting," for example, is only 2 mm wide. The necessity for this will be understood when it is realized that the external overall dimensions of a complete miniature valve are only about 16 mm diameter by 55 mm long and that the assemblies with which this factory deals require the mounting of up to six components between two circular mica discs of only 16 mm diameter. Some types incorporate no fewer than five grids.

One of the departments at the Mullard assembly factory for miniature valves



Above: Assembling the cage of a five-grid type battery valve. Right: Welding the completed cage of a mains valve to its base

Sub-assemblies for five different types of valve are dealt with, four battery and one mains. The production methods adopted are quite distinct from those in practice at Mitcham, where assembly work is completely individual. At Gillingham the operators are arranged in small groups. For the simplest type of assemblies, for instance, two girls engaged on "caging" (assembling the top and bottom micas, grids, anodes and beam plates and screens) feed three welders who spot-weld the bases, getter rings, etc. The more complicated units have their production process broken down into a larger number of

stages. Service operators see that adequate supplies of components are available in the special trays provided, while " replacement girls " are available to deputize for operators who may be absent for any reason.

The output of the factory runs to many thousand valve assemblies per day. Mr. Kempson-Jones, head of receiving valve production at the Mitcham works and manager of the Gillingham factory, is enthusiastic about the quality and adaptability of the labour force there. The workpeople, he says, are made to feel that they are taking part in an attempt to reach a certain definite objective, namely to overcome a bottleneck.

Absolute cleanliness is essential and the girls are provided with white overalls which are changed immediately they become soiled. Attendance is excellent, absenteeism is low and output figures are said to be very satisfactory.

Electricity Supply in Poland

National Three-Year Economic Plan

BY the end of the war, plant in many key power stations in Poland had been destroyed, especially at Warsaw, Pruszkow, Gdansk (Danzig), Poznan and Wroclaw (Breslau). In addition turbine sets from the Moscice power station and the equipment of the 150-kV Starachowice station had been removed by the enemy. The rather poorly developed Polish transmission network had also been very severely damaged, and there was a serious deficiency of technical manpower.

In 1946 the country's output was 4,300 million kWh, or 16 per cent more than in the same area in 1938, as most of the key power stations, both hydro-electric and coal-fired, as well as of a good part of its transmission network, were in commission again. A national three-year economic plan envisages concentration of generating capacity in the coal-mining region of Silesia for which some 240 MW is to be constructed. The largest power station will be of 150 MW at Miechowice. All new boiler plant in Silesia is to be fired with slack which will increase the total yearly consumption of low-grade coal by some two million tons.

Last December 309 million kWh was generated in this district, an increase of 24 per cent over the previous December, and the staffs of the power stations numbered nearly 6,500. Restrictions were imposed on a few large consumers, but there has been no rationing or general load shedding.

A 16-MW turbine of Czech origin ordered before 1939 has recently been installed and two turbines totalling 17 MW have been ordered from Sweden and three totalling 115 MW from Switzerland. Switchgear is on order for a number of coal mines and steel works with independent power plants. Despite a wide distribution of orders the plant will probably not be in service before 1949. Recently representatives of French electrical concerns have inspected the Miechowice and Zabrze power stations to find out the replacements needed.

Upper and Lower Silesia are to be linked by 60-kV and 110-kV lines. Preparatory work is also being done on a 220-kV Silesia to Lodz transmission line later to be extended to Warsaw. Simultaneously a 100-kV line from Poznan to Gdansk is to be erected. When completed the Polish grid will have a total length of 865 miles with 17 transformer stations aggregating 560 MVA in capacity.

Outside Silesia additional plant is to be provided at Poznan, and Bobrowa Gora as well as hydro-electric plant in the Carpathian Piedmont, notably at Czechow, Porabka and Smukala, in order to increase the installed capacity by 25 per cent or 510 MW. Generally high priority is given to electrification of the countryside and reconstruction of the power industry in the formerly German territories.

In Warsaw a 27-MW turbo-alternator, the largest there, and a boiler rated at 120,000 lb have been restarted. This year the output is expected to be 180 million kWh with a peak of 50 MW (compared with 250 million kWh and 80 MW in 1939) and in 1950 to reach 260 million kWh and 100 MW. In addition to two reconstructed power stations, Warsaw will have a new coal-fired 200,000-kW to 300,000-kW station at Zeran, which will also supply steam to industries in the north-eastern part of the city.

The most urgent need is not only suitable capital goods but also large numbers of trained technical men, especially fully qualified foremen. The four secondary electrotechnical schools with sixteen supplementary courses are shortly to be reinforced by new institutions with training periods ranging from three months to three years.

Television Aerials. — At a meeting of the Chelmsford Highways Committee a member spoke of the unsightliness of the increasing number of television radio aerials being erected, and asked whether the Council could exercise any control. The Committee felt that as television became more advanced in its development an alternative type of aerial would be found, or the aerial would be eliminated altogether, and therefore decided that no action should be taken at present.

COMMERCE and INDUSTRY

Small Generating Sets. Progress in Laundry Research.

It was recently reported that the Ministry of Supply was facilitating the provision of the necessary materials to the manufacturers of small oil-engine generating sets, and it was hinted that the Government would expect to have a say in the allocation of this plant. Now, it is announced, the manufacturers have agreed to accept Government guidance in the placing of the sets to ensure that the buyers are engaged in work of national importance. It will be another condition of sale that the sets shall be used continuously and not merely as stand-by plant.

Firms wishing to purchase sets should get into touch with the regional controllers of the Ministry dealing with their products who will endorse the orders if they satisfy the conditions. The arrangements apply also in the case of imported plant.

Iron and Steel Prices

The Minister of Supply has made the Control of Iron and Steel (No. 58) Order (H.M. Stationery Office, price 1d.), which amends maximum prices, the principal alterations being increases in the price of foundry pig iron delivered to Scotland and the North East Coast, cylinder and refined pig iron, small sizes of heavy sections and joists, file steel, silicon manganese spring steel, wire netting and wire ropes.

E.T.U. Conference

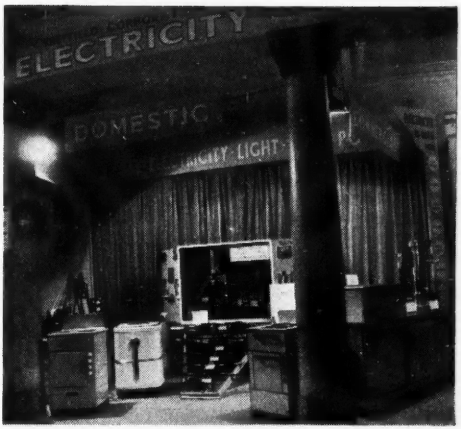
Mr. Frank Foulkes, general president, speaking at the Electrical Trades Union Conference which opened at Margate on Monday said in the course of his address that in spite of the Cabinet's constantly reiterating its intention to leave all industrial negotiations to the properly constituted machinery, individual Ministers had, from time to time, made statements which could only have been designed to have some bearing on current negotiations on hours or wages. These were not in the best interests of the movement and could be only the result of a lack of industrial experience on the part of the Ministers concerned, or their complete failure to appreciate the determination of the workers to obtain a fair share of any additional profits due to the increased tempo of industry. He went on to say that the Government must be made to realize that the pressure for more wages in the electrical industry must persist until such times as the industry was able to prove that non-producers were not in a more favourable economic position than those who worked and created the profits. If there were a case for the stabilization of wages, there was a much better case for the stabilization of profits.

The only outstanding success in wage negotiations during the past twelve months was the completion of the national agreement in the electricity supply industry, and while the 44-hour, five-day week could be accepted as an interim settlement pressure must be continued for the 40-hour week.

The conference adopted a resolution calling for a 42½-hour week and ultimately a 40-hour week.

Sheffield Fuel Utilization Exhibition

The Sheffield Corporation Electricity Department recently collaborated with the Ministry of Fuel and Power in a Fuel Utilization Exhibition. The Department's stand illustrated the wide field of electrical application. The industrial section, included exhibits of an electrically operated colliery winding gear, an automatically time controlled spot welding equipment, and a plating vat for the nickel and silver plating of cutlery, together with a selection of photographs.



Sheffield Electricity Department's display at the local Fuel Utilization Exhibition

In the domestic section there were modern appliances, whilst the commercial section was devoted to electricity in canteens, restaurants, etc. The centrepiece of the stand was a diagrammatic working model of a power station (lent by the Rotherham Corporation Electricity Department) showing the various stages in the production of electricity from the receipt of the coal to the final delivery of electricity to

the bus-bars. Samples of 33- and 11-kV joints prepared by the Department were also on show. A model of a 50,000-kW turbo-alternator (lent by the Metropolitan-Vickers Electrical Co., Ltd.) also attracted a good deal of attention.

Floating Exhibition on its Way to South America

Electrical industries are well represented in an exhibition staged in the South American Saint Line's 9,500-ton cargo liner, the m.v. *St. Merriel*, which sailed from the Royal Albert Dock for South American ports last week. The vessel will call at Rio de Janeiro, Santos, Montevideo, Buenos Aires and Rosario.

Of particular interest among the electrical exhibits are a display by Relco, Ltd. (Export Division of Elexcel, Ltd.), which includes an

Display by Enfield Cables and Enfield Rolling Mills on the M.V. *St. Merriel*

electric cooker, electric iron and electric fire, the Plessey Co's. selection of radio components, the Brush Electrical Engineering Co., Ltd.'s 2-ton industrial battery electric truck and 6-way distribution board, Enfield Cables' selection of compression cables, Burville Industries' 16-mm. sound and silent film projector, and Vandon Murray's battery charging set and direct lighting set. All the apparatus shown on the ship has already been purchased by South American buyers.

British Equipment in Dutch Air Liner

Equipment supplied by the G.E.C. has been installed in a Douglas DC4 chartered from Royal Dutch Airways and converted into a flying home and office by Mr. Bernard van Leer, a Dutch business man. The aircraft is now on a 30,000 mile flight planned to cover the Middle and Far East. The refrigerator, grill boiler, hotcupboards and water heaters were supplied by the G.E.C. and delivered and installed at short notice. All units operate at 24 V and are of special design for aircraft use. The galley capacity is such that a four-course hot meal for sixteen people can readily be prepared. The installation follows closely that in Mr. Winston Churchill's wartime "Skymaster" in which similar G.E.C. equipment was installed.

I.M.E.A. Convention Exhibition

About seventy electrical concerns are taking space in the exhibition which E.D.A. is organizing at the annual convention of the Incorporated Municipal Electrical Association (Bournemouth, June 23rd to 27th).

F.B.I. Policy

Speaking at the annual meeting of the Federation of British Industries on April 30th, Sir Clive Baillieu, the retiring president, said that although the Federation still maintained the belief that private enterprise was the best basis for a prosperous national economy it had sought in a number of ways to reconcile its responsibility to industry with the policies of the Government. In referring to the economic problems facing the country Sir Clive Baillieu said it was not enough to tell the nation that we must produce more and must therefore work harder. The people must be convinced that Government and industry were really placing first things first and that at last we were re-arranging our whole scheme of national priorities within a programme which was consistent with our resources.

The Federation intended to complete its fusion with the British Employers' Confederation; to concert with the Government the measures and machinery for the creation of the Planning Board announced in the 1947 Economic Survey; and to perfect and extend its organizations both at home and overseas and develop the work of its Regional Councils.

Engineering and Marine Exhibition

The Engineering and Marine Exhibition will be held at Olympia, London, from August 28th to September 13th. This year's exhibition embraces the whole of the main hall and national halls at Olympia, together with the galleries.

New London Showrooms

New showrooms for the retail sales of electrical apparatus, radio and television have recently been opened by Whizzards of Baker Street, at 136, Baker Street, London, W.1. The new premises are modern in design and have two large display windows facing Baker Street station. The ground floor showroom

has a representative display of domestic electrical appliances and, in addition to a further general showroom in the basement, there are separate soundproof rooms for such purposes as television, radio and vacuum cleaner demonstrations. Mr. B. Kennedy, the managing director, who showed us around the showrooms, told us that the firm maintains the apparatus and carries out servicing and repairs when necessary, and for this purpose it has a well-equipped workshop on the premises.

Institute of Fuel Headquarters

The Council of the Institute of Fuel has acquired No. 18, Devonshire Street, London, W.1 as new headquarters for the Institute. The acquisition has been made possible through the generosity of one of the Institute's collective members who has bought the lease on its behalf for £21,400, the Council having promised to find this amount as soon as possible. It is estimated that after minimum decorations, alterations and furnishings are completed, the sum of £25,000 will be required. Nearly £9,000 has already been received from contributions and the Council has issued an appeal to members to subscribe to the Building Fund. Cheques should be addressed to the Secretary of the Institute, 18, Devonshire Street, London, W.1, and crossed " Building Fund Account."

Laundry Research

Sir Edward Appleton, Secretary of the Department of Scientific and Industrial Research, speaking at a luncheon of the British Launderers' Research Association on May 1st, said that good progress was being made in research which might well change all the processes of laundering. It had been found that dirt was often held to a fabric by electrical attraction. The problem in the removal of dirt from fabrics was to break this electrical attraction which was done at present by the use of detergents—soap and kindred solutions. The British Launderers' Research Association was now investigating the use of supersonic vibrations to shake out the dirt particles and emulsify them in the cleansing solution. This would prevent the dirt being deposited again on the fabric.

Sir Edward also commented on the fuel economies brought about by laundries applying the advice of the Research Association. One laundry in the Midlands had reduced its coal consumption from 800 tons to 600 tons a year. Another on the South Coast had saved 42 per cent of the fuel previously used, by the use of electric motors instead of a steam prime mover.

Blackpool Apprenticeship Scheme

To provide an adequate apprenticeship training for youths wishing to enter the electricity supply industry and to create a pool of engineers and trained craftsmen from which to draw future staff for its Electricity Department, the Blackpool Town Council has just approved a comprehensive scheme covering trade, student and post-graduate apprenticeship courses. Not more than nineteen apprentices will be accepted —ten trade, five student and four post-graduate —and not more than five will be taken in each year.

Steel Conduit for Contractors

Mr. L. C. Penwill, director of the Electrical Contractors' Association, has informed his members that arrangements have been made with the Ministry of Works whereby the E.C.A. will issue " M " form authorizations for steel conduit in conjunction with the W.B.A. Emergency Scheme under which the E.C.A. issues priority symbols in respect of certain classes of emergency work. Full details are given of the conditions governing the issue of these authorizations.

Contractors' Whitsun Holidays

Under the National Working Rules of the electrical contracting industry all hours worked on Whit-Monday are to be paid for at the rate of time-and-a-half. The same rate is payable for the Tuesday following in the Bristol, Derby, Leicester, Nottingham, Sheffield and Sussex districts and for the following Friday and Saturday in the Manchester and Salford area. Special arrangements are in force in the North East Coast area. No wages are payable for any of the days mentioned, or for any additional days, which are observed as holidays.

Illuminating Engineering Society

At the annual dinner of the Illuminating Engineering Society, which is being held on Wednesday next at Grosvenor House, W.1, Mr. J. S. Dow, the president, will preside. The toast of the Society will be proposed by Lord Marley, chairman of the Colour and Lighting in Industry Council, and Dr. C. Hill will respond to the toast of the guests.

The Economic Situation

Sir Stafford Cripps, President of the Board of Trade, gave a Press conference particulars last week of the present economic position of the country and the immediate prospects. Emphasizing the greater need for more exports and smaller imports, Sir Stafford said that when we had overcome the coal shortage the man-power problem would still have to be settled before the full home and export requirements could be met. The effect of the five-day week upon coal production remained to be seen but in the previous week output had reached 4,107,000 tons—the highest since December, 1942. There would be a greater allocation of coal to industry during the summer months, amounting to about 89 per cent of the requirements.

Sir Stafford referred to the work of the Heavy Electrical Plant Committee and said that

the manufacturers were sub-contracting work to other sections of the engineering and ship-building industries to a greater extent than normally and steps were being taken to secure standardization. The possibility of securing some heavy electrical plant from Germany was being looked into. Repair of out-of-commission power station plant was being accorded the highest priority. It was expected that the encouragement of the manufacture and importation of Diesel generating sets for industrial use would provide about 200,000 kW by next March and a further 100,000 kW by the autumn of 1948. A portion of our capacity for heavy electrical plant would still be devoted to the maintenance of the highly-important export trade in this field.

New Philips Factory

On May 23rd the Secretary of State for Scotland is to lay the foundation stone of a new Philips factory at Hamilton, Lanarkshire, Scotland. Built by Scottish Industrial Estates, Ltd., for the Board of Trade, the factory will be rented to Philips Hamilton Works, Ltd., and employment will ultimately be found for 2,500 workers in the Hamilton area. The works will take at least two years to complete, on a site of roughly forty acres of which fifteen acres will be occupied by the actual factory buildings. Plans provide for construction in three sections and as each section is finished, equipment and plant will be installed and production started. Radio receivers and components will be made.

Dismantling of Portobello Plant

In connection with the scheme for modernizing the equipment of the Portobello power station of Edinburgh Corporation, some of the old plant is being scrapped to make way for new sets. The contract for the purchase and scrapping of the old plant has been placed with James N. Connell, scrap metal merchant, of Coatbridge, who has now commenced its dismantling.

Nickel in 1946

At the annual meeting of the International Nickel Co. of Canada, Ltd., in Toronto on April 30th, the chairman (Mr. Robert C. Stanley) made a comprehensive review of the nickel position in 1946. For the greater part of the year, he said, production was about 50 per cent of capacity but it was raised to 75 per cent during the last quarter. Sales of nickel in all forms was slightly reduced—from 201·6 million lb in 1945 to 201·1 million in 1946. The bulk of the output was taken by the steel industry. Its use for plating continued to expand and consumption for this purpose was about 75 per cent above the pre-war average, mainly for the nickel protective base used under chromium on automobile trim and in such fields as electrical appliances, furniture and plumbing. Electro-coated chemical equipment and the building up of worn shafting were two of the newer developments.

In his references to the Mond Nickel Co. in this country, Mr. Stanley said that £250,000 was being allocated to the rehabilitation of plant. The greater part of this expenditure would be shared between the nickel refinery at Clydach, near Swansea, and the Birmingham works of Henry Wiggin & Co., Ltd.

Trade Publications

Vactite Wire Co., Ltd., 24, Queen Anne's Gate, Westminster, London, S.W.1.—Catalogue of resistance wires, tapes and rods, including molybdenum, copper-clad iron, pure nickel, "Eureka," nickel-chrome and mandrel wire for making lamp filaments.

B.F. & C. Automatic Light Controlling Co., Ltd., Holdenhurst Road, Bournemouth, Hants.—Illustrated and priced folder on time switches for a.c. 200–250 V circuits up to 10 A, synchronous motor driven and hand wound clockwork types.

Runbaken Products, 71, Oxford Road, Manchester, 1.—Illustrated folder on the "Oilcoil" oil-insulated ignition coil for motor vehicles. Also an illustrated and priced folder on a mains operated flash tester with output of 500 to 3,000 V incorporating circuit breaker, pilot lamps and retractable test prods.

Radio Heaters, Toutby Works, Wokingham, Berks.—Illustrated leaflets on radio-frequency heaters.

Wright & Weaire, Ltd., 2, Lord North Street, Westminster, London, S.W.1—Catalogue of radio vibrators, coils, transformers and ceramic rotary switches.

Philips Lamps, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.—Illustrated service manuals for models 209 V and 462 A broadcast radio receivers.

Calendar

Bruce Peebles & Co., Ltd., have sent us an artistic calendar covering the twelve months May, 1947, to April, 1948. This is the tenth of the company's series illustrating Scottish castles, and the picture this year is Craigievar Castle in Aberdeenshire, which is printed in three colours. The calendar sheets have bold figures each showing the current month and also the preceding and following months.

Trade Announcements

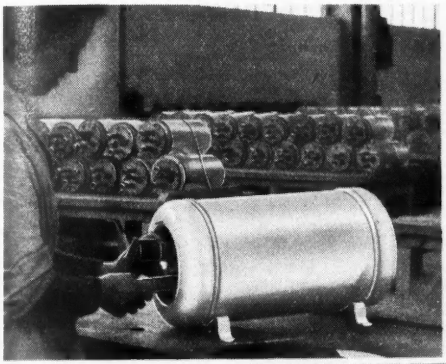
The Scottish Service Depot of E. K. Cole, Ltd., has been removed to Ekco Works, Duchess Road, Rutherglen, Lanarkshire (telephone: Rutherglen 2240).

The Bective Electrical Co., Ltd., has removed to 95, Baker Street, London, W.1 (telephone: Welbeck 5777).

Water Heater Production

Bringing New Industries to Scotland

IN accordance with the Government's wishes for the establishment of new industries in areas in which unemployment is most likely to develop, the whole of the Hotric electric water heater production was transferred a few months ago from Bishop's Stortford (where the manufacturers moved after their factory at Edmonton was damaged by bombing) to one of the new Board of Trade standard factories covering 25,000 sq ft at Broxburn, near Edinburgh. When Mr. G. W. Bartaby Pearson, managing director of H. Webb & Co. (Engineers), Ltd. (the purchasing organization), British Made Electrics, Ltd. (the manufacturing company) and Hotric, Ltd. (the selling organization) was refused permission to enlarge the Bishop's Stortford factory and was offered alternative accommodation in England, Wales and another site in Scotland, he chose Broxburn because of its pleasant surroundings and its proximity to Edinburgh, and his only regret now is that he did not move to Scotland thirty years ago.



A 1½-gal. thermal storage unit being inspected. Note the "Pyrex" glass containers in background

The removal to the new factory has not, of course, been unaccompanied by certain troubles and difficulties, but most of them are those which confront manufacturers generally all over the country, namely the shortage of materials, notably sheet steel and components, particularly ceramics and thermostats. This shortage of essentials has severely slowed down production and has resulted in only about 200 people being employed now instead of the anticipated 1,000. It has also led the company to overcome bottlenecks by making its own ceramics and thermostats. The former are already being produced: the latter will be made in a 40,000-sq ft extension of the factory just being commenced on an adjoining site. Here also will be installed a chromium-plating plant. Beside rendering the company self-supporting, this extension will provide the necessary facilities for the contemplated manufacture of a number of other electrical appliances, including hotplates, irons, fires, kettles, toasters and a "super" refrigerator for catering establishments.

Winding the element spirals on machines of Hotric design

Some of the items will be made under licence to American designs. The company will, however, continue to specialize in water-heating appliances and already has plans for a number of new models, among them a low-priced unit for greenhouse use.

With the comparatively small personnel now available the company is turning out about 6,000 water heaters a week. About 90 per cent of these are immersion heaters, mostly of the 2-kW size for Government and municipal housing schemes. The rest of the output comprises 1½-gal., 3-gal., 5-gal. and the 20-gal. "Duplex" thermal-storage units.

Threading the elements through the ceramic formers

Sectionalization of the factory provides for the drawing office, test and experimental departments, immersion heater and thermal storage heater assembly down one side, with element construction, tool room and maintenance department on the other. The machine shop extends down the centre of the works with offices situated at one end and the stores and dispatch at the other. Incidentally the stores are among the neatest we have ever come across in travels.

Winding of the nickel-chrome elements is carried out on machines of the company's own design, the wire being cut to approximately the right lengths in accordance with a certain specification and then tested for resistance. Separate assembly benches are set aside for the production of each type and voltage of element. A special feature of the design is that mica strips are inserted between the sections of the ceramic formers (through which the elements are threaded) to hold the wire and prevent "bunching" under load. A nickel-chrome centre-piece ensures rigidity. Shoulders on the bosses give both correct length and prevent the silver solder used for fixing from running through. The range of immersion heaters runs from 12 to 30 in. with loadings of from 1 to 3 kW, special units being made for oil heating, tallow liquefying, aeroplanes (110 V), etc.

The incorporation of patented "Pyrex" glass containers in the thermal storage heaters makes them especially suitable for providing hot water for drinking purposes and Mr. Basil Taylor, the company's commercial manager, who showed us round the works, told us that they had never had a single instance of the breakage of the glass under pressure. The only breakages reported were due to careless fitting. All units are tested under a 40 lb per sq in. pressure. An anti-splash device is embodied in the swivel arms, together with a screw for regulating the maximum water flow.

A completely self-contained sheet metal department is now working with the utmost proficiency. All metal bodies are made there and domes are spun at the rate of twenty an hour.

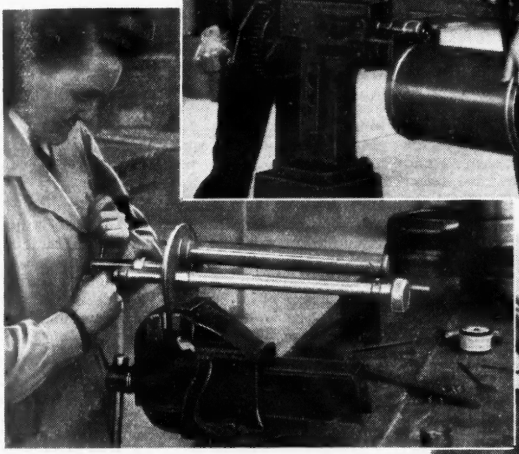
During the process of making the cases the sheet metal is rolled, swaged, spot welded, and finally, after de-rusting and degreasing, spray painted. Granulated cork is

Preparing copper tubes for immersion heaters

generally used for the insulation, but glass wool is also utilized.

In preparation for the expansion of its activities two training schemes have been inaugurated. Under one, which aims at producing future executives, selected men from the forces receive a three-months' course at a technical college followed by two years at the works. They receive about £6 a week from the Government and the company adds another £100 a year. Each of the present executives has one of these men under him to act as his substitute.

Swaging a case for a 1½-gal. storage heater



Commencing the assembly of a 1½-gal. thermal storage heater

Under the other scheme, for apprentices, boys of sixteen upwards are given free indentures, travelling and evening-class expenses, and 4d. a day towards canteen meals. After four to five years they should be fully trained electrical engineers, and will be certified accordingly.

Workers both in the Hotric and four neighbouring factories are fortunate to have the use of an all-electric canteen by Electric Canteens, Ltd., under the personal supervision of the managing director, Mrs. R. Bartaby Pearson, wife of the Hotric managing director.

Equipped with roasting and steaming ovens, vegetable boilers, fish fryer, water boilers, sterilizer, potato peeler, mixer and hot service counters taking between them about 150 kW, this efficiently organized concern serves daily between 500 and 600 well-cooked meals without any fuss or bother at remarkably low prices and still shows a profit. Incidentally, warnings for the half-hour lunch period and also the ten-minute breaks morning and afternoon are given in the factory not by bells or hooter but by coloured lights similar to traffic signals.

Insulating a storage heater with burnt granulated cork

NEW BOOKS

Manual on Telegraphy for Students

Elementary Telegraphy. By E. Missen, A.M.I.E.E. Pp. 340; figs. 108; index. George Newnes, Ltd., Southampton Street, London, W.C.2. Price 12s. 6d.

This is one of a series of books for communications engineers written by a former member of the Post Office engineering staff. The object is stated to be the provision, for teachers and students, of an elementary manual suitable for the Grade L telegraphy examination of the City and Guilds Institute, but it goes a good deal farther than that.

Comparison with the standard textbook of the 1890's (Preece & Sivewright) reveals immediately the enormous development which has taken place in the art of communication since those days. Starting with a comparison of telegraph codes, clear notions are given of the speed unit, the baud, followed by explanations of the start-stop principle and of the operating principles of the No. 3 and No. 7 teleprinter mechanisms in use in the Post Office. This section is extraordinarily well done. The isometric drawings of the different parts of the two printers are most beautifully executed and deserve the highest commendation. No fewer than twelve fully explanatory drawings are given and the accompanying text is adequate and clear. Fig. 8 could have been larger with advantage by printing it on a folding sheet so that the reduction need not have been so great.

Telegraph relays, including the "299" and "320" types, are described and the principles of Gulstad operation and of the static relay dealt with. Galvanometers, milliammeters and voltmeters form the subjects of the next section; another on filters follows, the graphic method of Pierre David being employed. Thermionic valves are covered so far as amplification, various methods of rectification, oscillation and level compensation.

The theory of a.c. transmission is covered, though because of the limitations of space imposed upon the author, many of the important formulæ had to be stated without proof. The author here shows by an arithmetical step-by-step method, first published by Prof. A. Hay, the sent and received currents with time in a tee-circuit of two resistance series elements and a condenser as a shunt element, an approximation to an aerial telegraph line. The resulting curves show the shapes of the signals at the sending and receiving ends.

This is the first British textbook to ascribe the advantage of double current working to the fact that the received marking and spacing currents are equal and opposite and in consequence, if the receiving relay is neutrally adjusted, it will repeat the received signals without bias. The author also points out that the shape of the signals is the same if for $+V/2$ and $-V/2$, voltage V for marking and zero voltage for spacing are substituted. The shunted condenser and the magnetic shunt as signal shaping means at the receiver are explained.

The section on voice-frequency telegraphy is very complete; duplex and composite telegraphy, phantoming and different types of teleprinter private service are described. A complete chapter is devoted to "Telegraph Instrument Room," including methods of testing. The subject of signal distortion and its measurement is very completely treated and the final chapter is devoted to power supply.

The book is well printed and has a comprehensive index. The drawings and diagrams are clearly reproduced and the young student, after its perusal, will be stimulated to increase the scope of his reading.—H.H.H.

A Guide to Official Publications on Building. By Colin Penn, A.R.I.B.A. (120 pp.). Architectural Press (for the Royal Institute of British Architects), 45, The Avenue, Cheam, Surrey. Price 6s.

Over 7,500 sources of information on all aspects of building construction and equipment are referred to in this guide, the author of which is organizer for the Association of Building Technicians. Key letters and numbers are given for each subject (including many electrical references) and in the latter part of the book the reports and other publications mentioned are briefly summarized.

Radio Receiver Servicing and Maintenance. By E. J. G. Lewis. Pp. 324; figs. 160. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 8s. 6d.

There have been three editions and six reprints of this book. To this fourth edition a chapter has been added on a.c./d.c. receivers and American midget sets. More material has been provided on gramophone pick-ups, turntable motors and loud-speakers. Circuit diagrams of typical receivers of various classes have been included with information about the electrical values and purposes of different components.

Engineering Organization. By James J. Gillespie. Pp. 268; 70 figs. Sir Isaac Pitman & Sons, Ltd. Price 12s. 6d.

This is a second edition of a work issued before the war covering a wide range of subjects of which engineering managements should have some knowledge. Among the matters dealt with are primary management considerations, planning, ordering, research, the drawing office, quality and material control, inspection, purchasing, stores organization, maintenance, job analysis, rate-fixing, finance, sales methods, etc.

ELECTRICITY SUPPLY

Belfast Undertaking's Future. Additional Plant for Fulham.

Bath.—CABLE EXTENSIONS.—The Electricity Committee has approved extensions of existing cables estimated to cost £11,853, and expenditure in connection with the installation of transformers of larger capacity.

Belfast. — UNDERTAKING NOT TO BE NATIONALIZED.—Belfast Corporation last week withdrew its opposition to a Bill, sections of which empower the Northern Ireland Government to take over Corporation property without compensation. In a letter to the Lord Mayor, the Prime Minister gave an undertaking that the city's electricity or transport services would not be taken over by the Government.

Cheltenham.—DISTRIBUTION OF SURPLUS.—It is estimated that a surplus of approximately £10,000 will be available for rebate to electricity consumers, but the Council has not yet decided on a specific method of allocating this sum among the various classes of consumers.

Croydon.—REDUCTION OF STANDING CHARGES.—Last year the Council agreed to certain tariff alterations, including an increase of 0·1d. in two-part-tariff running charges and a reduction in standing charges by discontinuing the 20 per cent addition applied in 1940. Standing charges are payable in advance and in order to give consumers the benefit of the reduction the Electricity Committee recommends that it shall take effect as from January 1st. The total cost will be about £10,000.

CAPITAL EXPENDITURE.—Details of projected capital expenditure by the Corporation which have been furnished to the Ministry of Health show that electricity outlay for 1947-48 and the ensuing two years is estimated at £3,214,774, £2,983,000 and £1,808,600, respectively, the bulk being in respect of the new generating station.

Darlington.—LOAN.—The Town Council has received sanction to the borrowing of £11,620 for supplying electricity to the Haughton-le-Skerne housing site.

Fulham.—FURTHER EXTENSION OF POWER STATION.—Last year a fifth 60,000-kW turbo-alternator was started up at the power station, bringing the total plant installed (with a 10,000 kW house set) up to the planned capacity of 310,000 kW. At a meeting of the Borough Council last week it was reported that the Central Electricity Board agreed to a proposal made by the borough electrical engineer (Mr. W. C. Parker) that the house set should be taken out and replaced by a further 60,000-kW set, making the total capacity 360,000 kW, and had issued a formal direction accordingly. The plant is to be ready for commercial operation in September, 1950, and the estimated cost of the extension, together with ancillary works is £1,562,300, without allowing any credit from the disposal of the 10,000-kW set. In addition, various works are to be carried out with regard to the restoration of gas-washing facilities, including the installation of a pilot experimental plant for operation on one half of a boiler for the production of ammonium sulphate. The cost of these additional works will amount to some £579,000.

The Staff Committee recommends that a sum of £2,100 per annum for four years shall be paid to the borough electrical engineer and £700 to his staff for extra services in connection with the extensions. It was stated that if consulting engineers were employed the appropriate fees would be in the region of £105,000.

PURCHASE OF RADIO SETS.—It was reported that an order had been placed for 500 radio sets at an estimated cost of approximately £6,000.

Glasgow.—COOLING TOWERS.—The Corporation Sub-committee on Town Planning has approved in principle the erection of two cooling towers near Pinkston power station.

Hammersmith.—JUBILEE CELEBRATIONS.—Revised arrangements for celebrating the fiftieth anniversaty of the undertaking include a reception and dinner on June 20th, a staff dance on June 21st, and a half-day holiday with pay. A souvenir brochure is to be issued. It is proposed to present a commemoration plaque or certificate to W. N. Froy & Sons, Ltd., the only remaining one of the original nine consumers connected to the mains on June 21st, 1897.

MAINS EXTENSION.—To afford a supply of electricity to houses in Rayleigh Road which are being converted into flats, provide a three-phase supply to Netherwood Road and Rockley Road area for further development, and erect an e.h.v. substation in Rockley Road application is being made for sanction to borrow £11,000.

SWITCHGEAR AT OLYMPIA.—At a cost of £5,550 the Council is to replace e.h.v. and h.v. switchgear in the substation on the premises of Olympia, Ltd.

Huddersfield.—LIGHTING SYSTEM TESTED.—Members and officials of the Corporation and neighbouring local authorities, together with Ministry of Transport divisional engineers and officials of the General Electric Co., Ltd., were present when tests of the "Uniway" lighting system were carried out along part of Bradford Road. Mr. J. M. Waldram (G.E.C.) stated that the new system seemed to be doing everything they expected of it.

Lancashire. — SUGGESTED NEW POWER STATION.—The Lancashire Electric Power Co. is considering the erection of a new power station on a site adjoining the existing station at Padiham, and the borough surveyor of

Burnley has received a letter from the Town Planning Officer of the North East Lancashire Region No. 2 asking for his observations regarding the scheme.

Manchester.—MAINS AND SUBSTATION PLANT.—The Electricity Committee proposes to spend £160,270 upon 33-kV feeders and substation plant.

Mansfield.—NEW FACTORY.—A substation is to be built for supplying electricity to a new Ministry of Works factory in Sutton Road at an estimated cost of £4,011.

North Lincolnshire.—RURAL DEVELOPMENT.—The North Lincolnshire and Howdenshire Electricity Co., Ltd., has announced details of a five-year plan for the electrification of rural areas. Hamlets with a population of not more than 30 to 40 people are among the places for which a supply is to be provided.

Orkney.—SUPPLY INAUGURATED.—A supply of electricity by the North of Scotland Hydro-Electric Board to Stromness was inaugurated last week when Councillor Mrs. Clouston operated a switch in a café and soda fountain establishment in the presence of representatives of the Board and Stromness Town Council.

Oswestry.—LOWER CHARGES.—As from the March quarter the lighting flat rate is being reduced from 6½d. to 5½d. per kWh. Under the business rate the quarterly charge of 6s. 6d. per lamp is lowered to 5s. 6d. and all consumption over 12 kWh per lamp is charged at 2d. instead of 4d. per kWh.

Scarborough. — SUBSTATIONS. — Tenders are being obtained by the Town Council for the erection of substations at Filey, Newby, East Ayton, West Ayton and Seamer. Sanction has been received to borrow £2,124 for the erection of a substation and the provision of mains, etc., to supply a housing estate at Sandybed. Estimates prepared include £704 for mains and £1,082 for switchgear in connection with a substation at Valley Bridge.

Stockport.—LOANS.—The Electricity Committee is to apply for sanction to borrow £85,046 for cables, switchgear, etc., for the lighting of roads and supply to houses on the Bridge Hall estate, and £3,579 for improving the supply at Stepping Hill Hospital.

Stockton-on-Tees. — LOANS. — Sanction has been received to borrow £7,816 and £5,739 for supplying electricity to the Durham Road area and Phœnix Works industrial site respectively, £4,846 for cables, and £5,942 on expenditure to meet increased demands in the Station Road area of Norton.

Wallasey.—HOUSING DEVELOPMENT.—The Corporation proposes to spend £47,100 on the supply of electricity to housing sites.

West Hartlepool.—PROPOSED DISCOUNT.—It is recommended by the Electricity Committee that a rebate of £25,000 to the Corporation from the North-Eastern Electric Supply Co., Ltd., shall be distributed to consumers in the form of a special discount over six months.

Willesden.—RECONSTRUCTION SCHEME.—The Council has recently authorized a loan sanction application for the sum of £155,610 for the secondary reconstruction scheme, dealing with thirty-eight substations.

York.—IMPROVING RURAL SUPPLY.—The Electricity Committee proposes to install automatic reclosing circuit breakers at certain substations on its 11-kV network in order to reduce interruptions to rural supplies. The estimated cost is £1,567.

TRANSPORT

Brighton. — TROLLEY-BUS POWERS. — The Ministry of Transport has extended for a further three years the time for the exercise of the Corporation's powers relating to the running of trolley vehicles on certain routes.

Bury.—ABANDONMENT OF TRAMWAYS.—Subject to the delivery of new omnibuses, it is expected that the town's remaining tramway services—to Walmersley and Tottington—will be abandoned in November.

Darlington.—PROPOSED MOTOR BUS SERVICE.—The transport manager (Mr. W. J. H. Penman) and the borough treasurer (Mr. W. Nuttall), in a joint report to the Town Council, have recommended that the town's trolley-bus system shall be replaced by motor-buses. Darlington's trolley-bus system was introduced twenty-one years ago to replace trams.

Italy.—SIMPLON LINE ELECTRIFICATION.—The journey from the Swiss frontier to Milan will be shortened by about two hours as a result of the electrification of the Italian section of the Simplon line which was inaugurated last week. The Milan correspondent of *The Times* says that the work has taken over two years and has cost the Government 2,000 million lire.

London.—GRIT EXTRACTION AT LOTS ROAD STATION. — Chelsea Borough Council has received from the London Passenger Transport Board a précis of a report prepared by the Sturtevant Engineering Co., Ltd., on a scheme for the installation of grit extraction plant at the Lots Road power station. The total cost of the installation by the company will be approximately £20,000, and the chairman of the L.T.P.B. has given his approval to the scheme if the Borough Council considers it satisfactory. It appears that the scheme may achieve a great improvement in existing conditions, but as the contractors' report is highly technical it has been agreed that the report should be further considered by London County Council officers, in consultation with Dr. Parker, Director of the Fuel Research Station, Greenwich.

UNDERGROUND RAILWAY EXTENSION. — A further two miles of the Underground Central Line eastward extension was opened on Monday, taking the service to Leyton and Leytonstone.

RECENT INTRODUCTIONS

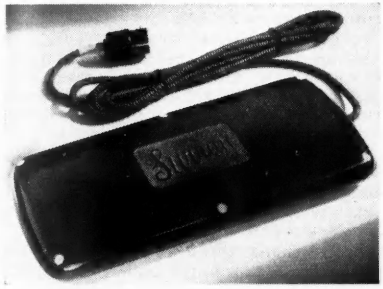
Notes on New Electrical and Allied Products

Soil-heating Equipment

THE outfits made by S. B. JACKSON, LTD., Windsor House, Victoria Street, London, S.W.1, are now being insulated in a way that enables them better to withstand the rigorous conditions of horticultural service. Improved three-heat connections are provided as well as lugs to permit the transformer to be mounted. An alloy element wire, bare and flexible, has been introduced to minimize corrosion; it is continuous without joints, so avoiding voltage drop across the latter and is manufactured in 60-ft lengths for 250-W equipment. Another range of elements up to 100 ft long will shortly be offered for the variety of loadings needed by amateur and commercial growers.

Miniature Bedwarmer

A mains-energized bedwarmer that occupies little room when travelling is made by SINGLETON BROS. (INSTRUMENTS), LTD., Oreston Lane, Effingham, Surrey. It weighs 1·25 lb and is 10·25 in. long by 4·5 in. wide and 1·25 in. thick. The 60-W element coils consist of nickel-chrome wire encased in toughened glass tubing and controlled by a thermostat. The black bakelite casing grips the connecting

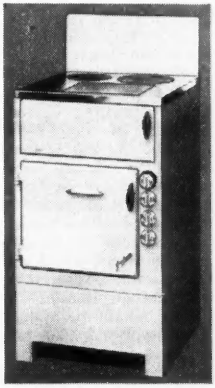


Miniature bedwarmer in flat bakelite case

cable, which is also anchored to the element plate, in this way minimizing strain on the terminals. The wholesale distributors are L. Le Personne & Co., Ltd., 7, Old Bailey, E.C.4.

Cabinet Cooker

The latest household cooker made by the JACKSON ELECTRIC STOVE CO., LTD., 143, Sloane Street, London, S.W.1, will be available for delivery this spring. It is a cabinet model of very different external appearance from the pre-war design. The oven is 13⅜ in. deep by 14 in. wide and 12¾ in. high, with heating elements at the sides, enabling food to be cooked on the floor and close to the roof of the oven without burning. On the hob are two boiling plates of 6¼ and 8 in. diameters, loaded to 1,000 and 1,800 W respectively, while the griller-boiler is 10½ in. wide by 8 in. deep and loaded to 2,000 W. An 8-in. Backer-Jackson radiant boiling plate



Jackson "Cleanline" 193-J cabinet cooker

is offered as an optional extra if preferred; it does not require the use of special utensils.

The standard a.c. model is fitted with thermostatic oven control, which can be omitted if desired, while the boiling plates can be provided with "Simmerstat" control as an optional extra. All the elements are of the plug-in pattern, easily removable without tools; the hob fittings comply with the E.D.A. requirements in respect of interchangeability and earthing. The right-hand wall is removable for servicing the wiring, switches and fuses.

The oven is seam welded to minimize rusting of the joints and all parts are vitreous enamelled. The hob is made of heavy gauge pressed steel with a dull chrome top that does not easily show scratches and its edge is polished, while the exterior finish is mottled grey vitreous enamel.

The overall dimensions of the model 193-J are 21 in. wide and deep by 36 in. high, in conformity with the recent B.S.1195. The alternative model 193-JG is identical, except that the oven has bottom heat and guards over the elements. A feature of importance is that the elements of the griller-boiler, 8-in. boiling plate and oven are interchangeable with those of model 192-J minimizing stocks of spares.

Clock Batteries

Master clocks which pulse-control "slave dials" throughout large buildings are usually energized by accumulators connected in parallel and trickle charged through a rectifier from the a.c. mains. For this duty the CHLORIDE ELECTRICAL STORAGE CO., LTD., Clifton Junction, Manchester, is offering a special range of cells of the "low loss" type, which is eminently suitable for such service and charging conditions.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Switchgear & Cowans, Ltd.—Presiding at the annual meeting held on April 29th, Mr. H. Burroughes (chairman) said that they had experienced the worst trading year in the last decade. He reminded shareholders that last year he stated that there was a shortage of manpower which had not only limited their own output of the components they made themselves, but had, in turn, caused shortages and long deliveries of bought-out components and materials. At the beginning of the year under review they still had uncompleted Government contracts of considerable value on which disposals claims had not been agreed, but upon which production work had been stopped. This created a gap which it was found difficult to bridge due to the impossibility of obtaining skilled draughting personnel and skilled operatives, and on account of shortages in various types of bought-out material. The re-equipment of the plant and machinery begun in 1945 and continued during 1946 was now nearly complete. The demands for their products in all sections—power house, substation and mining equipment—was greater to-day than ever before. Especially was this the case with electrical equipment for mines; the volume of this business showed over 100 per cent increase above the pre-war output and it was still rising.

Babcock & Wilcox, Ltd., report a profit for 1946 of £766,109, plus provision for Civil Defence and A.R.P. not required, £13,380, less provision for obsolescence, £100,000. This compares with a profit for 1945 of £649,956, plus E.P.T. refund of £33,879 and special dividends from subsidiaries of £172,940 net. It is proposed to pay a final ordinary dividend of 7 per cent and a bonus of 3 per cent, making a total distribution for the year of 15 per cent, less tax (against 12½ per cent for 1945).

Morphy-Richards, Ltd.—The list of applications was to open and close yesterday (Thursday) for 150,000 ordinary stock units of 1s. each offered for sale by Robert Benson & Co., Ltd., at 25s. per unit. After allowing for the stock units sold and included in this offer, A. Reyrolle & Co., Ltd., will hold approximately 30 per cent of the issued capital. The directors are of the opinion that the profits for the year ending June 30th, 1947, will justify the payment of a dividend of not less than 160 per cent, equivalent to a yield of 6·4 per cent on the price at which the stock units are offered for sale.

British Oxygen Co., Ltd.—After providing for E.P.T., deducting £500,000 (£537,557) for U.K. income tax and crediting £150,000 (nil) adjustment of E.P.T. in respect of earlier years, the net profit for 1946 was £668,858, compared with £520,587 for 1945. The final ordinary dividend is 12 per cent (against 8 per cent and a special anniversary dividend of 4 per cent), maintaining the total distribution at 20 per cent to which it was increased last year. A sum of £200,818 (£100,000) is allocated to general reserve and £100,389 (£80,445) is carried forward. Consolidated profits of the group were £2,219,768 (£2,311,280), the net profit—after crediting E.P.T. adjustment and providing £674,002 (£894,291) for U.K. income tax and overseas taxation—being £914,751 (£686,073).

Sangamo Weston, Ltd., reports a trading profit of £105,444 for 1946, plus other income of £2,080, making £107,524, as compared with £25,517 for the preceding year, and a net profit of £47,001 (against £2,493). The dividend for the year is 17½ per cent (against 15 per cent), and £174,744 is carried forward (against £142,902 brought in).

Newman Industries, Ltd., reports a net profit for 1946 of £82,830 (compared with £82,608 for the preceding year) to which is added £22,619 brought in, making £105,449. After deducting £34,000 for tax it is proposed to pay a final ordinary dividend of 12½ per cent and a bonus of 2½ per cent, maintaining the distribution for the year at 22½ per cent. The balance carried forward is £36,101.

The Electric Supply Corporation, Ltd., reports a net revenue for 1946, after providing £37,000 for taxation, of £43,597, as compared with £36,886 for 1945. The dividend for the year is maintained at 10 per cent and £59,017 is carried forward (against £47,389 brought in).

The British Thermostat Co., Ltd., is paying a final dividend of 11 per cent (same), but in addition this year a bonus of 5 per cent is also paid, raising the total distribution for the year from 18½ per cent to 23½ per cent.

The Bridgwater & District Electric Supply & Traction Co., Ltd., reports a trading balance for 1946 of £27,013 (against £27,139). The ordinary dividend for the year is 6 per cent (same).

Richard Johnson & Nephew, Ltd., are paying a final ordinary dividend of 11¼ per cent, making 15 per cent for the year (against 9 per cent for 1945-46).

Laurence, Scott & Electromotors, Ltd., are maintaining their dividend for the year at 12½ per cent.

Tube Investments, Ltd., has declared an interim dividend of 12½ per cent (against 10 per cent).

W. Canning & Co., Ltd.—The net profit for 1946, after tax, amounts to £117,718, compared with £61,201 for 1945. In addition to a final

dividend of 5 per cent (same) a bonus of 17½ per cent (12½ per cent) is being distributed, making the total for the year 27½ per cent (22½ per cent).

The **London Electric Wire Co. & Smiths, Ltd.,** reports an increase in net profits, after deduction of tax, from £87,041 in 1945 to £157,732 last year. It is proposed to pay a bonus of 2½ per cent (against nil) in addition to the final ordinary dividend of 5½ per cent (same), making a total payment of 10 per cent (7½ per cent) for the year. A sum of £50,000 (nil) is transferred to reserve.

The **Superheater Co., Ltd.,** reports a net profit for 1946 of £153,555 (against £142,293). The total ordinary dividend for the year is 42½ per cent less tax (same), plus 2 per cent tax free (nil) from surplus on realization of investments.

The **Cables Investment Trust, Ltd.,** has declared an interim dividend of 2 per cent (same).

Lacrinoid Products, Ltd., is again paying a dividend of 10 per cent for the year.

New Companies

Gilbert Thomas (Worcester), Ltd.—Registered April 28th. Capital, £10,000. To acquire the business of an electrical engineer, etc., carried on by G. Thomas at Morris Avenue, Worcester. Directors: G. Thomas and E. P. C. Brown. Regd. office: 11, Bromyard Terrace, Worcester.

City Electrical (Birmingham), Ltd.—Registered April 22nd. Capital, £3,000. To acquire the business carried on by City Electrical Co., at 42, Augusta Street, Birmingham, 18. Directors: V. L. George and Mrs. Susan A. George. Regd. office: 42-3, Augusta Street, Birmingham.

Knight Electrical Industries, Ltd.—Registered March 29th. Capital, £3,000. Manufacturers of, and dealers in, electric lamps, wireless and other valves, electrical plant, etc. Directors: C. I. Van der Vleugel and L. D. Pope. Regd. office: 149, Stafford Road, Wallington.

Cherry and Heaton, Ltd.—Registered March 27th. Capital, £1,000. Electrical engineers and general electrical installation contractors, etc. Directors: S. Cherry and J. Walsh. Regd. office: 372, Preston Old Road, Cherry Tree, near Blackburn.

Comet (Manchester), Ltd.—Registered March 18th. Capital, £1,000. Mechanical and electrical engineers, electrical installation contractors, etc. Permanent directors: B. G. Foster (managing director), Nellie E. Pickering and R. S. Smyth. Regd. office: 161, Hamilton Road, Longsight, Manchester, 13.

England & Johnson, Ltd.—Registered March 19th. Capital, £2,000. Wholesalers and retailers, importers and exporters and manufacturers of, and dealers in, electrical goods, fittings, apparatus and accessories. Directors: A. C. England and P. C. Johnson. Regd. office: 36, Caledonian Road, N.1.

Electrical & Associated Services (Mumbles), Ltd.—Registered March 29th. Capital, £250. Electrical, radio and general engineers, etc. Directors: Mrs. Gertrude T. Duncan and M. N. Lapper. Regd. office: 4, Queen's Road, Mumbles, Swansea.

L. Carlen & Co., Ltd.—Registered March 29th. Capital, £5,000. To acquire the business of electrical and radio engineers and dealers carried on at 164, Derby Lane, Liverpool, 13, and to adopt an agreement with Lawrence Carlen. Directors: L. Carlen, Mabel Carlen, G. J. Jones, B. Rice and J. Shaw. Regd. office: 164, Derby Lane, Liverpool, 13.

Ranelagh (London), Ltd.—Registered March 31st. Capital, £500. Electricians, dealers in electrical and radio products, etc. Directors: E. R. Bird (managing director of Ranelagh Radio & Electrical Co., Ltd.), Mrs. Mary Doolan, and Mrs. Marie Allen. Regd. office: 55, Westbourne Grove, W.2.

R. Hale & Co. (Electrical), Ltd.—Registered March 28th. Capital, £1,500. To acquire the business of an electrical contractor and radio engineer and dealer carried on by R. Hale at Beverley, Yorks. Directors: R. Hale and Janet Hale. Regd. office: 35, North Bar Within, Beverley.

Lumitron, Ltd.—Registered March 15th. Capital, £100. Manufacturers of, and dealers in, electrical apparatus, etc. Directors: A. Moss and A. J. Moss. Regd. office: 53, Goodge Street, W.1.

Increase of Capital

British Electric Meters, Ltd.—Capital increased by £50,000 beyond the registered capital of £50,000.

Liquidations

W. Ottway & Co., Ltd.—Winding up voluntarily. Liquidator, Mr. W. T. Ottway. This notice is purely formal, the liquidation being for the purpose of the reconstruction of the company. All debts, liabilities and other obligations will be paid and discharged in full.

The Cuba Submarine Telegraph Co., Ltd.—Meeting June 9th at 5, London Wall Buildings, London, E.C.2, to receive an account of the winding-up by the liquidator, Mr. A. R. Smith.

Winding-up Petition

The Eastern Telegraph Co., Ltd.—A petition for the winding up of this company has been presented to the High Court and will be heard in London on May 12th.

Bankruptcies

J. Wilson, electrical engineer, carrying on business at 81, Bradford Road, Riddlesden, Keighley, Yorks.—First meeting May 9th at the Official Receiver's Office, Hallfield Chambers, 71, Manningham Lane, Bradford. Public examination June 4th at the County Court, Manor Row, Bradford.

STOCKS AND SHARES

STOCK Exchange business is running on a fairly even keel. The buying is, on the whole, better than the selling, with the result that the trend of prices is upwards. Both investment and speculation give indications of becoming more active. Cable & Wireless ordinary and Eastern Telegraph 3½ per cent preference are again outstanding features of strength. Electrical equipment and manufacturing shares keep very firm, absorption by investors serving to hold market quotations. In an increasing number of cases the scarcity of supply begins to make itself manifest, and buyers find that it is not too easy to pick up stock they require.

Dividends and Reports

Telegraph Condenser 10s. ordinary shares have been a firm market since the increase in the dividend from 7½ to 10 per cent., with the addition, as before, of a 5 per cent cash bonus. The price rose half-a-crown on the announcement, to 36s., and is now 34s. 6d. Preliminary figures revealed an increase in the trading profit from £83,500 to £98,800, and a surplus of earnings equal to a further 30 per cent gross on the £150,000 capital. On the total distribution of 15 per cent, the yield works out at £4 7s. 6d. per cent. Ever Ready report, in their preliminary figures, a fall of £120,000 in the net profit, but the dividend is being maintained at 40 per cent. Last year a tax-free victory bonus was added. At 45s. 6d., the yield comes to £4 7s. 9d. per cent.

The Week's Price Changes

A number of encouraging dividend announcements has assisted the industrial markets to maintain a firm front in the face of continued anxiety over business conditions. Electrical equipment shares have once more been singled out as a particularly sound field of investment over the next few years. Of the leaders in this market, General Electrics have advanced during the week to the level £5. A.E.I., at 87s., English Electric, at 68s. 9d., and Crompton Parkinsons, at 34s. 6d., are all about 1s. 6d. higher. Among the cable manufacturers, Enfields have recovered another florin, to 47s.; Johnson & Phillips at 85s. and Telegraph Constructions at 57s. 6d. have added 1s. 3d. each, while B.I.C. are 2s. up at 49s. Lancashire Dynamos are outstanding with a 10s. rise to 6¼. De la Rue at 67s. 6d. are 7s. 6d. up. Other noticeably firm spots are Metal Industries "B", at 58s. 9d., Automatic Telephones at 78s. 6d., Vactrics at 17s. 6d. and Pye deferred at 31s. 3d. In the engineering group, Babcock & Wilcox rose to 81s. before reacting to 78s. 9d. The company has increased its dividend from 12½ to 15 per cent.

Eastern Telegraph 3½ per cent preference provided the main feature in the market for communication stocks. A week ago, the price was 135; a month ago, 112. Within the past few business days, stock has changed hands at 149. From this there was a couple of points reaction. Cable & Wireless ordinary at 177½ is up 2 points, after being 180; the preference at 113 is 5½ down.

Company News

An increase in the Tube Investments interim dividend from 10 to 12½ per cent came as an agreeable surprise to the market and has lifted the price of the shares by 7s. 6d. to £7. Last November's decision merely to maintain the year's dividend at 22½ per cent caused some disappointment, and lately the shares have been subdued by anxiety about the adequacy of the group's steel supplies. Other well received dividend decisions were the doubling of the Parkinson & Cowan distribution, to 5 per cent for the year, and the raising of British Thermostat's total payment to 23½ per cent, against 18½ per cent for 1945. The latter's shares, with a rise of 2s. 6d. to 25s., show a yield of 4¾ per cent on the higher dividend. Laurence, Scott & Electromotors are maintaining the dividend at 12½ per cent for the sixth successive year. At 14s. 3d. the 5s. shares pay £4 7s. 9d. per cent on the money.

Telephone Manufacturing and E.P.T.

Dealings began last week in the new 5s. shares offered to Telephone Manufacturing shareholders in the proportion of two new for every seven shares held. They are changing hands at 3s. 9d. premium on the issue price of 10s. On the basis of the 9 per cent dividend paid without a break since 1936, the yield is £3 12s. 9d. per cent. This is one of the relatively few companies whose accounts disclose the actual amounts paid in E.P.T. In 1945 the tax took as much as £212,000, leaving only £25,800 for distribution after income tax and other charges. The comparatively mild imposition of a 12½ per cent tax on distributed, and 5 per cent on undistributed, profits has induced hopeful market calculations about the benefit to distributable earnings. The price has hardened to 14s. 6d.

Shares on Offer

With impressive security behind the offer, De La Rue have lately been able to make successfully an issue of £500,000 3½ per cent £1 preference shares at par. The shares are quoted now at a small premium, and can be bought, in the form of renounced allotment letters, free of transfer stamp. Plessey 4½ per cent preference are still available in the same form at 22s. 9d., to yield nearly 4 per cent. On English Electric 3¾ per cent preference, in which there is usually a free market, the yield is little more than 3¼ per cent at the present price of 23s. A similar return is given on Henley's Telegraph 4½ per cents at 27s. 6d. Small lines are on offer of the 7 per cent preference shares of Ericssons and Electric Construction. In each case the price is 40s. 6d. and the yield, therefore, just under 3½ per cent.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

ALLMANNA Svenska Elektriska Aktiebolaget.—" Apparatus for charging electric accumulator batteries." Cognate applications 21823/44 and 21824/44. November 18th, 1943. (587196.)

W. J. Bilton and G. Scratchley.—" Power-operated portable hand drills." 22353. November 13th, 1944. (587143.)

Braithwaite & Co. (Engineers) Ltd., and J. B. Steel.—" Welding electrode holders." 8507. May 5th, 1944. (587124.)

British Insulated Cables, Ltd., Taylor, Tunnicliff & Co., Ltd., J. C. Quayle, C. H. Forshaw and W. Vose.—" Manufacture of ceramic bodies." 4700/47. December 4th, 1945. (Divided out of 586903.) (587268.)

British Thomson-Houston Co., Ltd.—" Compositions suitable for use in electric capacitors." 13053/43. August 19th, 1942. (587230.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Cassettes for holding sensitive films." 17416. October 22nd, 1943. (587154.)

Brookhirst Switchgear, Ltd., and B. Heller.—" Electrical terminal boards or the like." 24557. December 8th, 1944. (587304.)

Carlisle Electrical Manufacturing Co., Ltd., H. V. Carlisle and J. Burns.—" Electrical fuses." 2810. February 15th, 1944. (587115.)

Compania para la Fabricacion de Contadores y Material Industrial Soc. Anon., and P. Viteau.—" Cathode ray tubes for use in television reception." 11890. June 22nd, 1944. (587125.)

Gummers, Ltd., and A. E. Ellis.—" Thermostatic valves." Cognate applications 1756/44 and 2716/44. January 21st, 1944. (587190.)

Hazeltine Corporation.—" Tunable ultra-high-frequency system." 25930/44. February 1st, 1944. (587222.)

Landis & Gyr Soc. Anon.—" Switch contacts." 12949/44. July 9th, 1943. (587169.)

C. F. O. Lister and A. B. Wearing.—" Lighting appliances." 23483. November 24th, 1944. (587256.)

Marconi's Wireless Telegraph Co., Ltd.—" Facsimile telegraph apparatus." 4451/44. November 30th, 1942. (587274.) " Clamps." 21200/44. October 30th, 1943. (587293.)

Maschinenfabrik Oerlikon.—" High tension fluid-blast circuit breakers." 21815/44. November 29th, 1943. (587294.)

H. Miller & Co., Ltd., and W. R. Smith.—" Electric generators." 24357. December 6th, 1944. (587205.)

Okonite-Callender Cable Co., Inc.—" Buoyant electric cables." 12165/43. September 26th, 1942. (587152.)

Oldham & Son, Ltd., and H. Holt, jun.—" Apparatus for ascertaining the acid level in accumulators." 6866. April 13th, 1944. (587192.)

A. Reyrolle & Co., Ltd., and A. G. Lyle.—" Testing of electrical insulation." 18835. October 2nd, 1944. (587137.)

Sangamo Weston, Ltd.—" High-frequency dielectric heating apparatus." 13553/44. November 24th, 1943. (587172.)

Standard Telephones & Cables, Ltd.—" Power supply regulators involving vacuum tubes." 19376/43. November 26th, 1942. (587155.) " Voltage regulating system." 14675/44. August 31st, 1943. (587179.) " Frequency discriminator circuits." 25211/44. December 20th, 1943. (587212.)

Standard Telephones & Cables, Ltd., W. T. Gibson and L. C. Baker.—" Electrical devices contained within glass envelopes." 8301. May 2nd, 1944. (587236.)

Standard Telephones & Cables, Ltd., W. K. Weston, S. E. Buckley and T. Johnston.—" Manufacture of magnetic cores from magnetic dust." 18896. October 3rd, 1944. (587138.)

A. V. Summers.—" Electrically heated garments." 1362. January 25th, 1944. (587189.)

M. Tama and J. L. Hoff.—" Tiltable induction furnaces." 26072/44. January 3rd, 1944. (587226.)

Thermega, Ltd., and S. A. Singleton.—" Thermostats." Cognate applications 21065/43 and 24428/44. December 15th, 1943. (587111.)

Turbo Engineering Corporation.—" Turbine unit." 6077/43. April 18th, 1942. (587150.)

Vickers-Armstrongs, Ltd., and J. P. Watson.—" Electric power follow-up systems or remote control systems." 21027. July 19th, 1939. (587029.)

Weldall & Assembly, Ltd., and H. H. Conacher.—" Electric switch devices particularly for use with storage conveyors." 21641. November 4th, 1944. (587195.)

Western Electric Co., Inc.—" Reflection type target locating systems." 18411/44. October 1st, 1943. (587185.)

Westinghouse Brake & Signal Co., Ltd., and L. E. Thompson.—" Alternating electric current rectifying apparatus of the dry surface contact type." 23930. November 30th, 1944. (587201.)

Westinghouse Electric International Co.—" Synthetic resins for use in producing electrical insulation." 7069/44. April 17th, 1943. (587160.) " Compositions for activating metal surfaces." 13986/44. July 29th, 1943. (587176.)

Westinghouse Brake & Signal Co., Ltd., and

A. H. B. Walker.—" Alternating electric current rectifying apparatus of the dry surface contact type." 23037. November 20th, 1944. (587057.)

Wild-Barfield Electric Furnaces, Ltd., and G. H. S. Grene.—" Salt bath furnaces." 21369. November 1st, 1944. (587078.)

F. R. Williams and P. H. Davies.—" Thermostatically controlled electric domestic appliances." 21950. November 8th, 1944. (587197.)

Amended Specifications.

577276. Standard Telephones & Cables, Ltd., and others.—" Radio blind-landing arrangements."

581566. W. T. Henley's Telegraph Works Co., Ltd., and others.—" Electric cables."

Trade Marks

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from April 30th:—

ELECTROMATIC. No. 644,933, Class 7. Electrically-operated valves for use in pneumatic systems in aircraft.—Dunlop Rubber Co., Ltd., Fort Dunlop, Erdington, Birmingham.

Design. No. 643,212, Class 9. Radio apparatus, and parts thereof included in Class 9; gramophone pick-ups, microphones, amplifiers and loudspeakers, all for use in the electrical reproduction of sound; television apparatus and parts thereof included in Class 9; electric oscillation generators; batteries and accumulators.—Pye, Ltd., Radio Works, St. Andrew's Road, Cambridge.

Design. No. B644,164, Class 9. Gauges and electric switches.—Dennison Watch Case Co., Ltd., 28, Villa Road, Handsworth, Birmingham.

TURBATOR. No. 646,493, Class 9. High vacuum electronic tubes.—Aktiengesellschaft Brown, Boveri & Cie, Haseltrasse, Baden, Switzerland. Address for service: c/o Marks & Clerk, 57-58, Lincoln's Inn Fields, W.C.2.

ALEC DIBBINS (design). No. 644,302, Class 11. Electric lighting apparatus and appliances and fittings therefor.—Alec Dibbins, Ltd., 19, Eton Rise, Haverstock Hill, Hampstead, N.W.3.

SNACKMASTER. No. B644,485, Class 11. Counters incorporating heating devices and hot cupboards, all for use in serving food.—Ewart Catering Equipment, Ltd., Trojan Works, Brent Crescent, North Circular Road, N.W.10.

PERSPEX. No. 645,899, Class 11. Electric lighting apparatus and appliances and installations for ventilating, etc.—Imperial Chemical Industries, Ltd., Wexham Road, Slough, Bucks.

IRECO. No. 646,683, Class 11. Electric cookers, hotplates, electrically-heated hot water radiators, toasters, water heaters, drying cupboards and air conditioning installations.—Irlam Engineering Co. (1942), Ltd., Hayes Road, Cadishead, near Manchester.

Next Week's Events

Monday, May 12th—

LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. " The Work of the Sub-Marine Section during the War," by W. H. Leech. (Preceded by the annual meeting.)

Tuesday, May 13th—

LONDON.—Institution of Electrical Engineers, Radio Section, 5.30 p.m. Discussion on " Future Trend of Component Design for the Services," opened by G. W. Sutton and E. M. Lee.

LONDON.—At the Institution of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. Illuminating Engineering Society. Annual general meeting.

LONDON.—At the Connaught Rooms, Great Queen Street, and the E.A.W., 35, Grosvenor Place, S.W.1. Electrical Association for Women. Annual conference (May 13th and 14th).

CAMBRIDGE.—Cavendish Laboratory, 6.30 p.m. I.E.E. Cambridge Radio Group. " Crystal Waves," by R. Bleaney, J. W. Ryde and T. H. Kinman.

Wednesday, May 14th—

LONDON.—Institution of Electrical Engineers, Transmission Section, 5.30 p.m. " Recent Research and Development Work in Sweden on High-Voltage A.C. and D.C. Power Transmission," by Dr. W. Borgquist.

LONDON.—Grosvenor House, Park Lane. Illuminating Engineering Society. Annual dinner.

LONDON.—Institution of Electrical Engineers, London Students' Section, 2.30 p.m. Visit to Asea Electric, Ltd., Walthamstow, E.17.

GLASGOW.—Reid's Tea Rooms, 34, Gordon Street. Association of Mining Electrical and Mechanical Engineers, West of Scotland Branch. Annual meeting followed by film.

Thursday, May 15th—

LONDON.—Institution of Electrical Engineers, 5.30 p.m. Annual general meeting.

LONDON.—Savoy Hotel, W.C.2., 10 a.m. Electrical Wholesalers' Federation. Annual meeting and luncheon.

LONDON.—Savoy Hotel, 12.30 for 1 p.m. Provincial Electric Supply Association. Annual luncheon.

DUBLIN.—1, Foster Place, 6 p.m. Institution of Electrical Engineers, Irish Branch. Annual general meeting.

Friday, May 16th—

LONDON.—35, Grosvenor Place, S.W.1, 7 p.m. Women's Engineering Society, London Local Section. " Women in Post War Engineering."

Saturday, May 17th—

LEEDS.—City Electricity Department, Whitehall Road, 2.30 p.m. Institution of Electrical Engineers, North Midland Students' Section. Annual general meeting and films afternoon.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue in given in parentheses.

Ashton-under-Lyne. — May 19th. Housing Committee. Electrical wiring in 54 permanent houses. (May 2nd.)

Birkenhead.—May 13th. Electricity Department. Cables, meters and general stores for 12 months commencing July 1st, 1947. (April 25th.)

May 24th. Three-phase 6·6kV reactor. (May 2nd.)

Brighouse.—June 9th. Electricity Department. Two 11,000-V switchboards. (See this issue.)

Brighton.—June 2nd. Electricity Department. L.v. paper insulated mains cable for one year from July 1st, 1947. (See this issue.)

Edinburgh.—The closing date for the receipt of tenders for the control and indication equipment advertised in our issue of March 28th has been extended from April 25th to May 23rd.

India.—MADRAS.—June 19th. Government Electricity Department. 11-kV and lower voltage switchgear and accessories. (May 2nd.)

Liverpool.—May 14th. Electric Supply Department. Transformers. (April 25th.)

Manchester.—May 20th. Electricity Committee. Static transformers for a two-year period. (May 2nd.) Ventilating plant in turbine and boiler houses at Stuart Street power station. (April 25th.)

May 27th. Electricity Committee. One petrol-electric mobile crane. (See this issue.)

South Africa.—PRETORIA.—July 1st. City Council. Electric travelling cranes. (May 2nd.)

Tees Valley.—June 24th. Water Board. Electrically-driven centrifugal pumping plant, Contract No. 12. (Deposit: £5 5s.). Particulars from T. S. R. Winter, engineer to the Board, Corporation Road, Middlesbrough.

Walsall.—May 24th. Electricity Supply Department. Cable covers. (See this issue.)

Warrington. — June 30th. Corporation. Electrically-driven sewage and storm water pumps, and two sludge pumping sets, for the Sankey Valley drainage scheme, Contract No. 7. (Deposit: £5). Particulars from John Taylor & Sons, Artillery House, Westminster, S.W.1.

West Hartlepool.—June 10th. Electricity Department. Eight 500-kVA transformers. (See this issue.)

Willesden.—Corporation. May 19th. Electrical installations in 44 houses and 12 flats. (April 25th.)

Orders Placed

Fulham.—Electricity Committee. Accepted. Apparatus in connection with further standardization and reinforcement of the distribution system to be carried out in 1947:—L.v. switchboards (£9,024).—W. Lucy & Co. Ring main switchgear.—A Reyrolle & Co. (£6,566); South Wales Switchgear (£1,402). Local distribution transformers (£10,295).—English Electric Co. One 500-kVA transformer (£632).—South Wales Switchgear. Cables (£66,112).—Aberdare Cables.

Manchester.—Transport Committee. Accepted. General stores for period ending March 31st, 1948:—Insulation tape and bus cables.—B.I. Callender's Cables. 660-V and 250-V cables.—Hackbridge Cable Co. Bus cables.—Henley's. 660-V and 250-V cables.—Mersey Cable Works. Electrodes.—Met.-Vickers Electrical Co.; Rockweld. Portable handlamps and flexibles.—J. C. White & Co. 250-V cables.—Wholesale Fittings Co.

Northumberland.—County Council. Accepted. Electrical installation at Berwick Institution (£618).—I. & E. Morton.

Tynemouth.—Corporation. Accepted. Four transformers (£534 each).—C. A. Parsons & Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aldershot.—Secondary school, Manor Park (£108,000); county architect, The Castle, Winchester.

Amesbury.—Houses, Winterbourne Earls (£35,837), for R.D.C.; James & Crockerell, builders, Durrington Walls, Salisbury.

Bathavon.—Houses (54), rural area; R.D.C. surveyor, 10, Green Batt, Bath.

Belper.—Factory for Sylcote (Belper), Ltd.; A. P. Taylor, architect, 59, Chapel Street.

Blyth.—Houses (81), North Farm estate, for the T.C.; direct labour.

Bradford.—Houses (30) for T.C. (£40,159); A. Shepherd & Sons (Clayton), Ltd., builders, 12, Windermere Road.

Bromsgrove.—Extensions to works, Birmingham Road, for Waivis Engineering Co. Ltd.; chief engineer.

Carlisle.—Dining centre, Harraby School; Cleghorn & Co., builders, Carlisle.

Dining centre, Dalston C.E. School; Ashbridge & Morrison, contractors, Carlisle.

Chaddesden.—School, Cherry Tree Hill, for Derbyshire E.C.; F. Hamer Crossley, county architect, St. Mary's Gate, Derby.

Chester.—Houses (50), Browns Lane, Handbridge; T. Warrington & Sons, Ltd., builders, Station Street, Ellesmere Port.

Corby.—County Boys' School for Northants E.C. (£80,000); J. Ellis & Sons, Ltd., Welford Road, Leicester.

Crewe.—Works, near railway station, for British Rollmakers, Ltd.; Sir A. Gibb & Partners, architects, St. Anne's Lodge, London, S.W.1.

Felling-on-Tyne.—New department for International Paint & Composition Co.; J. R. Rutherford & Sons, Dene Joinery Works, Jesmond, Newcastle.

Gateshead-on-Tyne.—Civic restaurant for Town Council (£7,500); borough surveyor.

Greenhithe.—New research laboratories for Associated Portland Cement Manufacturers, Ltd., at Stone Castle; company's staff.

Hull.—Factory, Stoneferry estate; Scruton, Stanton & Co., Ltd., builders, 79, Leonard Street.

Jarrow-on-Tyne.—Factory for Crushing & Screening Co., Ltd.; W. Hall, Ltd., Derwent Joinery Works, Gateshead-on-Tyne.

Kidderminster.—Rebuilding the Harry Cheshire Council School; Pritchard, Godwin & Clist, architects, Bank Buildings.

Mansfield.—Factory; A. Mason (Contractors), Ltd., Sutton Road.

New Kyo (Durham).—Juvenile training centre at miners' hostel; Wright & Kellett, Finchale Terrace, Chester-le-Street, Co. Durham.

North Riding.—Electric lighting installations at the North and South Cowton County School, Skelton and Brotton, Skelton Infants' County School, and Whitby Mount County School for the North Riding E.C.; county architect, County Hall, Northallerton.

Otley.—Houses (26), Well Busk Lane for U.D.C.; M. Harrison & Co. (Leeds), Ltd., builders, Post Hill Quarries, Farnley, Leeds.

Scarborough.—Factory and office, Queen Margaret's Road, for the Scarborough Hosiery Co.; Alderson & Allen, architects, Filey Road.

Shipley.—Factory, for Wicksteed & Andreare, Ltd.; P. T. Runton & Co., architects, District Bank Chambers, Bradford.

Skelmersdale.—Houses (80), and bungalows (18), for U.D.C.; J. Gee, builder, 23, Worsley Street, Pemberton.

Southampton.—Temporary factory buildings on reclaimed land; borough architect, Civic Centre.

South Shields.—Houses (150) for T.C.; borough engineer.

Factory for S. Newman, Ltd., Come Street, South Shields (£40,000).

Stockport.—School, Old Road, and presbytery for Rev. J. Turner, St. Mary's R.C. Church; F. M. Reynolds, architect, 9, Albert Square, Manchester, 2.

Stockton-on-Tees.—Motor body building and repair shop, Norton Road, for F. Arrowsmith; R. Winstanley, architect, 184, Thorntree Road, Thornaby-on-Tees.

Offices and flats, Church Road, for H. Moat & Son; G. P. Stainsby, architect, 57, High Street.

Offices for Tarslag, Ltd., Bowesfield Lane; G. P. Stainsby, 57, High Street.

Thetford.—Two grammar schools (£70,000); C. H. Thurston, county architect, 25, Thorpe Road, Norwich.

Wakefield.—Works, Grantley Street, for Translucent Glass Co., Ltd; Wheatley & Houldsworth, architects, Savile Street, Hull.

Wallasey.—Junior and infants' school, for managers of St. Alban's R.C. Schools; E. Kirby & Sons, architects, 5, Cook Street, Liverpool, 2.

Walsingham.—Permanent houses (34), East Barsham and Great Ryburgh; J. Bamford, housing officer to R.D.C., The Square, Fakenham.

West Hartlepool.—Primary school, Seaton Carew, for E.C. (£117,000); borough engineer.

Willesden.—Factory and office block, Old Oak Common Lane, for Concrete Slabs Co.; Hugh Roberts & Davies, 13, Suffolk Street, Haymarket, S.W.1.

Willington.—Houses (112) for the Crook and Willington U.D.C.; builders, R. G. Findlay, Ltd., Sunderland; plans, T. A. Page, Son & Hill, 75, King Street, South Shields.

Worcester.—Adaptations at Hindlip Hall, for county police headquarters, with electrical work, for Standing Joint Committee; county architect, 38, Foregate Street.

Worksop.—Houses (70), Carlton, Harworth and Nether Langwith; surveyor, Rural Council Offices, Carlton Road.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Mexico.—The London technical representative of a Central American concern wishes to get into touch with a British supplier of American-type bakelite accessories (including screw-cap lampholders) with a view to placing an order for them. (X.179.)